

The Art of Life
THE WAY TO HEALTH AND LONGIVITY.
DESIGNED FOR BOTH THE EDUCATED PUBLIC
AND THE
MEDICAL PRACTITIONER.

BY

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WITH AN INTRODUCTION BY

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TO THE
Memory of my Professors
Surgeon General Sir GERALD BOMFORD,
M.D., C.I.C., K.C.S.I., F.M.S., (RETD).

Late Director General of Indian Medical Service and
Principal of Calcutta Medical College.

Sir R. HAVELOCK CHARLES,
M.D., F.R.C.S., M.Ch., K.C.V.O., F.M.S., (RETD.)
Physician in ordinary to *His Majesty George V.* King of
Britain and Emperor of India, and Late Professor
of Anatomy Calcutta Medical College.

This work is dedicated.

Pawlowa says --"It is only when the full etiology of disease is known that the medicine of our day can become the medicine of the future -- that is to say, hygiene in its widest sense."

PREFACE.



For some time past it was my earnest desire to present a book which should be an useful one to the laity and to the medical profession alike. The former will find in it varied and valued ingredients touching upon the broad hygienic principles of life and the ways to keep good health from the cradle to the grave, while the latter in addition to the benefits above, will not fail to catch the most obscure intrinsic physiological and pathological points that are dealt with systematically throughout the course *e.g.* cell metabolism, hyperchlorhydria, hypersecretion, auto-intoxication, auto-infection, indicanuria, indolaceturia, creatinuria, acidosis etc. Massage, exercise, mental suggestion, rest, diet, baths and light are very important in the proper practice of the medical profession and it needs no explanation to point out why they are so important for they speak for themselves.

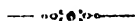
The interest of the book has been doubly centred by the insertion of an introduction from the pen of Lieut. Col. R. L. Dutt, M.D., I.M.S. (Retd) who very kindly as always acceded to my request and to whom my grateful thanks are due.

In conclusion I have to thank my old friend, Sj. Nogen-der Nath De, for kindly going over the proof sheets.

CALCUTTA,
August 1911.

J. L. Chandra

INTRODUCTION.



I read the greater part of the little book "Art of Life" by Dr. Chundra and found it very interesting from several points of view. It is a synopsis of the latest views on physiology, biology and bacteriology, given in simple language and it suggests the prevention and cure of the common diseases prevalent in India. It will therefore be of great help to the general public and of special benefit to medical men as a book of reference.

R. L. DUTT, M.D., L.S.A., M.R.C.S.,

LT. COL. I.M.S. (Retd).

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The Art of Life.

CHAPTER I.

THE PRINCIPLE OF LIFE.

Vis medicatrix naturæ

(The healing tendency of nature.)

Before entering the threshold of this grand problem, we must try to understand **what life is**. According to modern scientific discoveries, it is a perpetual motion of cells, a constant multiplication of organic constituent elements in the human body. The microscope has demonstrated that all organised bodies, animal and vegetable, are made up of minute cells—that humanity begins in a cell and everything that shows organic life is made up of one or more cells. When cell stops to perform its work, we call it death. Death is of two forms :—

1. Sudden cessation of all the organs to do their respective duties.
2. Molecular death.

Death from apoplexy, heart disease, etc., is an example of the former, while the patient suffering from diabetes, phthisis, pernicious anæmia etc., who is daily dying by inches is an example of the latter. Hence we come to the conclusion that the fundamental basis of animal and vegetable

life begins in cell or cells. Its or their activity is life; its or their inactivity is death.

Of a living human being.

Water constitutes 70 per cent.

Cell-salts 5 „ „

Organic matter 25 „ „

The inorganic cell-salts being little in quantity, were thought to be of little importance. But recent scientific investigations have shown that the cell-salts are the vital portion of the body - the workers, the builders; that the water and the organic substances are simply inert matter, used by these salts in building the cells of the body.

Inorganic cell-salts are 12 in number (chlorides and phosphates of sodium and calcium, potash, magnesia, sulphur, iron, silica, etc.)

Organic matters are glucose, fat and albuminoid substance.

We are a chemical composition, living on the earth and composed of 14 elements- oxygen, carbon, hydrogen, nitrogen, iron, calcium, magnesia, sulphur, potassium, phosphorus, sodium, fluorine, chlorine and silica - and when any of these elements are lacking or deficient in the system, the machinery of life is out of order and "Disease sets in, and the only **Law of Cure** is to supply the deficiency."

Let us all learn for good the one important lesson from the teachings of **Life Chemistry** that nothing cures - that does not supply deficiencies, and this being true, cures are not effected by mere drugging nor by the law "*similia similibus curanter*," but by the law that *cures hunger*.

Physiology has thus revealed the constituents of our body and God's plan can not be improved upon by systematically introducing a poison into the system.

DRUG HABIT.

Certain drugs when abused produce a craving which hampers the victim's health happiness and prosperity. No pen can picture the suffering endured by the man or woman who falls into this awful condition.

The writer has observed two patients, one an Indian nobleman of 35, the other a "pardana" lady of 40.

The former suffered from Facial Neuralgia and had to recourse to morphine injection till three sets of doctors attended him for injection, of course one did not know the presence of the other, at different hours of night and day. The man had injection of 2 to $2\frac{1}{2}$ grs. of morphine within 24 hours for a period of 6 months. But something on a sudden upset the balance and the man made a strong determination to give up injection: he is now a healthy man worthy of its name.

The latter is suffering from Bronchial Asthma of a very obstinate type defying every practical medicine for last 6 years. During fit of asthma she is getting an hypodermic injection of 1.8 gr. of heroin hydrochloride three times a day surpassing all physiological bounds. She becomes so to speak the slave of the drug instead of its master.

These two illustrations point out that medicines when abused create a world of mischief.

As a rule, the profession pays little attention to this class of patients, and look upon them as being incurable. This is a mistaken idea, as this condition is as amenable to treatment as any other pathological condition. I say pathological, because after the drug habit is once thoroughly formed, the entire system is in a diseased condition, both physically and mentally. These patients are powerless to help themselves, and it is my opinion that no class of individuals deserve sympathy more than the unfortunate drug-addicted or drug-diseased patients. Ignorance of the awful effects of the drug landed them in the vortex of destruction.

Writer's plan of treatment of these cases is largely
Psychological

MORPHINE HABIT.

It is very necessary to overcome those terrible sweats and nervous manifestations that follow the withdrawal of the drug. This is very easily done by scientific methods of massage and electricity, combined, occasionally with small doses of hyoscine and lupulin—hops mixture. The writer never gives over the three-hundredth part of a grain of hyoscine at a dose, and always with lupulin, and never to the point of producing delirium, which hyoscine will produce when given in too large doses.

Never allow inefficient medical men to "shoot" them full of hyoscine and other drugs until they are crazy.

ALCOHOL HABIT.

Let the rising generation of youth stamp this truth, the whole truth, and nothing but the truth upon their tender mind that alcohol when abused is one of the main destroyers of our vitality, shatters our health, borders us even on the verge of insanity and transmits for future generations a legacy of the most cruel and relentless form of misery to which human life can suffer. An inveterate alcoholic is a typical example of morally rotten, physically wrecked creature that ever lives on the face of the earth.

The writer recommends the following formula: -

1. To allay the craving.

R.

Spt. ammon aromatic	m. xxv
Tinc. Capsicum	m. vii
Tinc. Nucis Vomica	m. v
Aq. Carui	ad. 5. i

Mft. for a dose. Sig. one twice a day.

2 To remove the craving altogether.

R.

Hypodermic or intramuscular injection of Tabloid

Hypod. Atropinae sulphatis et strychninae Sulphatis.

It should be given once a day for some weeks and then less frequently.

Hemmell (*American Medicine*, August, 1910) lays great stress upon the good results which can be obtained by the use of ammonium chloride in the treatment of alcoholism in all its phases. According to the author 30 grains of the drug dissolved in a drachm of water and given at one dose, followed by a copious draught of water, not only will

counteract the effects of the alcohol and sober the patient rapidly, but will prevent the onset of delirium and overcome the craving for alcoholic stimulants. If after the ingestion of the drug the patient has not quietened down in the course of two or three hours some hypnotic such as chloral hydrate or a bromide mixture should be given. As a rule when the patient awakes after this treatment there will be felt no craving for alcohol. The author points out that while 30 grains may seem a very large dose of ammonium chloride to give, in view of the gastrointestinal irritation which it is said it produces, when given as an antidote for alcohol, only a single large dose is administered, and that this is followed by a copious draught of water.

COCAINE, "GUNJA," "CHARAS" HABIT.

Suggestion and psychological influence are the two potent weapons to kill the devil of these bad habits.

Cold shower bath, open air life, some occupation, massage and good moral atmosphere are indispensable.

What higher aim can man attain than conquest over these so-called human craving. It is the triumph over human suffering, which is our greatest possession, a triumph compared to which no victory is greater, for it is the imperishable glory of robbing even death of its terrors.

Calomel does not cure, it increases peristalsis mechanically and stimulates liver being indirect cholagogue, but it

*Ganja, charas &c are cerebral excitants and are used by Indians for intoxication.

does not lay the axe at the very root of constipation. Opium is not a curative, it simply produces paralysis of the nerve centre in place of neuralgia ; one suffering from colic is not cured by morphine injection, but it masks the symptoms by inducing sleep.

Let the sick stamp this in their mind that there is only one sure way to be restored to health, and that is the natural way through the blood by supplying deficiencies.

Can we as physicians cure disease ? Certainly not. The disease will have its own course. We are like a helmsman steering our ship (patient) amidst the foaming ocean of disease watching right and left that the ship may not be capsized or dash against the rock of complication.

The writer had a discourse with a medical friend who informed him that his patients were better so long they had been under medical treatment not to speak of days or months but years ; of them some were tubercular, others malarial and so on.

How could he dispense with medicine when it exerted such a charming influence ? The question may be naturally asked, is it the physician that makes so many invalids in this land of ours or is it the patients that make themselves invalids by pressing and coxing the doctors for medicine in the phantom hope of cure as generally occurs with the neurasthenic and others, not knowing like an insect to be consumed by the fire of medicine ? The *rationale* sounds to my mind lies between the two. It is either the ignorance of the doctor or the folly of the patient, or a mixture of the two which creates invalidism.

The writer quotes from experience that from time to time he has to come across with patients suffering from some fanciful diseases of their imagination. They will describe a world of complaints. They do not welcome physician worthy of his name because he will give honest sound advice, but become the favourite hunting ground of the quack. They will visit one after another till their purse is over and finally become disheartened as if doomed to die. For such patients the best treatment would be to remove them from sympathetic circle and make them work so that they may have very little opportunity of thinking of their so-called disease.

Are we then not to use medicine when one is sick? Certainly not. It is the duty of a man and more so of a medical man to alleviate the suffering of the patient: to neglect this sacred duty we are sinning against humanity and God: but medicine should be used as medicine and not to be used like a common article of diet: it is like a whip to a tired horse, but if we go on whipping, it will surely come to a standstill: a conscientious practitioner will never stuff his patient with drugs, foreign poisons, for a considerable length of time knowing well the motto. "As you wish that man should do to you, do unto others likewise" We ought to stir up the patient with medicine when one is out of order, and after putting him to order, we should prescribe for him tissue remedies, as mentioned below. All diseases that are curable are cured in this natural manner. Man is the only creature on the face of the earth that eats cooked food and is subject to various kinds of disease.

The high pressure of modern living and dissipation is sucking, vampire like, the blood, the vigor, the vitality and

the nerve force of the young manhood of to-day, and when completely broken down to mental and physical wrecks, in a hopeless condition bordering on insanity, the madhouse, the *ghat* or the grave, they turn in despair to all the patent nerve nostrums so largely advertised with the hope of restoration to their former physical manhood : lost vitality can not be patched up with a mere stimulant.

-- --

A CURSE OF CIVILIZATION.

In the morning of the world, when the ancestors of the modern civilized world were roaming in their native forests in a condition of primitive barbarism, nine-tenth of modern diseases were unknown to them, because they were Nature's children defying the sun and rain. Constipation, dyspepsia, &c. were foreign to them. Parturition is a common physiological function without abnormal pain. They need no accoucheur or midwife to attend them.

An illustration.

One early morning in the Himalayas while the writer was feasting his eyes with the grandeur of the Kanchanjunga, the silvery tower of silence, the most glorious snow-capped mountain in the world that hangs in the blue sky, and admiring the Creator from "These Thy lowest works," the towering peaks became tipped, with a fiery light and almost flushed as if in flames.

The writer was bewitched in nature's naked beauty when presently he saw with a load of faggot on her back, a Bhutani woman who came adjacent by, dropped down the load as if in a hurry and disappeared in a forest.

The writer paid no heed to it, but once more absorbed in nature worship--"beauty watching over madness." Now magnificent peaks penetrating through all mists and clouds and "Throning eternity in icy halls" became dazzled in the sun on every side like a vast wall of adamant and silver surrounding the gay amphitheatre. After a lapse of an hour so far he remembered right, that woman turned up on the scene with a new born babe on her arm, placed it over the faggot bundle not less than one hund (80 lbs.) in weight, and went her way.

Vitality is outside man, and like solar energy, comes from the Great Author of all life. It is the free gift of Nature, and like fresh air, it depends upon our capacity to receive it. The capacity is modified according to environment. Man receives it according to his own measure. It flows in proportion as his vessels are clean.

The conditions for the free flow of the vital energy are two fold :

- i The body should be kept in good repair by food.
- ii. The mind should be undisturbed.

Vitality, somehow or other flows from the secret spring of calm and peace. Sleep is the symbol and expression of peace. It seems as if the Angel of Life comes in the silent hours of the night, and fills the empty pitchers of cells with vital energy which has been spent during the day ; the night of weariness gives place to the restored energy of the morning.

Vital force appears to be a compound of the moral and physical blended in due proportion. Either constitution

may be attacked by disease and then depress and affect each other. Every doctor knows that unless his patient has his heart set upon getting well, unless he brings to bear the powers of his mind to aid the physician's efforts, drugs can only be of temporary benefit. During a critical period when patient's life hangs by a hair there is a common cry among the laity to call for a better hand in consultation, and in ninety-nine cases out of a hundred we find the patient is temporarily better than what he has been before. It is the mind, the implicit faith of the patient which makes him well.

A critic may well ask that babies who can scarcely influence "will power" often get cured by medicine when diseased. Yes. Medicine exerts a potent influence in the cure of diseases, but it is so to speak one wing of the *bird of cure*, the other one being mind power.

An Illustration of mind Power.

During college days the writer had seen a cachectic patient with enlarged liver and spleen who came long way up to the Calcutta Medical College Hospital with the strong belief that he would be cured if he happened to be under the treatment of X-- doctor. His faith made him stand up on his legs. He came, got himself admitted and produced so far the writer remembers right, a bundle of prescriptions exhausting Pharmacopœia. The distinguished doctor prescribed a phial of coloured water, advised him to take it regularly and ordered the student to watch the case carefully. The tide had changed its course; he was getting better day by day. A new spirit was infused in his mind, and lo! in two months he was discharged as cured. Adjacent to his bed there lay another cachectic patient drowned in

medicine. Mark! he was daily dying inch by inch till he found peace in grave.

If the patient is apathetic, listless, despairing, allowing himself to drift helplessly, if he becomes panic-stricken or superstitious about his condition, the physician is placed at a great disadvantage. But if the doctor be something more than a materialist, if he has himself a big sympathetic soul and human insight, he will know how to combat the moral weakness, how to place his own strong "will power" under the drooping despondent one of the patient and secure a rally which will reinforce and sustain the good effects of his medicines.

Thus by means of judiciously selected remedies and mind power the doctor will stimulate certain depressed parts or sedate other excited ones, restore the physical mechanism to its normal equilibrium, and it will run along smoothly so long as sufficient moral force is generated by right living to sustain the integrity of the moral constitution.

This is no figment of the imagination. The eye of faith, the ear of belief, and the arm of courage, are as essential in their exercise and proper nourishment as are the physical members.

In short the man has a moral as well as a physical constitution, and the successful physician will not ignore the power of moral attributes and influences over his patients, but will study how to use them effectively in making cures.

Drug and suggestive therapeutics are inseparable.

The doctor himself is the great factor in suggestive treatment. His personality, the personal equation, is what counts

for most. His dress, speech and mannerisms are taken into careful account by sick people. As a general rule it is bad policy to joke with patients or indulge in humorous remarks, although it is imperative that a quiet cheerfulness should fairly bristle from the doctor while in the sick room. He should appear pleasant, optimistic and carry a sensible dignity with him and should endeavour to talk enough without becoming garrulous.

Bring the patient to his natural environment and have the full benefit of fresh air (sea-breeze, balmy mountain air if possible) sun shine, pure water, open air exercise, plenty of suitable clothes, plain food, ripe fruits, refreshing sleep and rest, also supply the deficiency of cell salts, thus health, strength, energy and vitality are yours.

The great German scientist, Virchow, proved to the world, beyond a doubt, that there is but one *Disease* and that is *Cell Disease*.

"Disease of the body," to explain more clearly, is "the disease of the cells of the body." The force that develops and controls all these cells of the body is the force we must look to heal the body when it is diseased or injured.

This force or power which the physiologists call "Vitality," the psychologists call "Unconscious Mind," "Subliminal Mind," *i. e.*, mind below the threshold of consciousness, is under the influence of our conscious mind; as when the face becomes red from shame and anger, which results in dilatation of the arterioles, or when fear causes paleness which results from contraction of the arterioles, and other instances might be given. Availing himself of this force

the physician can accomplish much for the benefit of his patient. He should always carry sunshine into the sick room.

The circle of disease has two sides :—

(1) Psychical.

(2) Physical.

1. It has a physiological basis ; and the fact that quacks and charlatans have, in the past and in the present, been using it should be no reason why physicians should not use it. They would find it to be one of the most useful therapeutic agents of all they have been using to relieve and cure the sick in a certain class of cases.

2. It should be treated by the physician with his potent weapons of drugs, diet and hygiene.

Dr. Albert Robin, of the French Academy of Medicine, announces the phosphate of sodium as the latest "Elixir" of Life. It strikes to me that Liq. Acid phosphates (phosphoric acid in combination with calcium; magnesium, iron, sodium and potassium) is a tissue remedy which one can safely take to supply the deficiency of the system : Dose 15 drops in sweetened water.

An ideal combination would have been with glycerophosphates of calcium, magnesium, potassium, sodium and iron without strychnine or quinine which are foreign poisons, and therefore can not come under the category of tissue remedies.

For patients suffering from malaria Elixir Glycerophosphates with quinine and strychnine is best.

For patients suffering from nervous debility Syr Glycero-

phosphates Co: (Huxley's Syrup) with strychnine is recommended.

For old people Syr: Glycerophosphates Co. with formates is an ideal combination. If people thus abide by the dictates of nature, there will be less suffering in this world.

"Life is real, life is earnest

And the grave is not its goal."

Life without health and strength is a failure, and like the blind man's tune played upon broken strings.

Tissue remedy restores broken or shattered nerves and is the most potent for rejuvenating and revitalising the entire system, prolonging life, of any remedy yet discovered.

DRUG NIHILISM.

The writer takes the liberty of quoting opinions of some of the greatest physicians of the day.

1. Dr. Oliver Wendell Holmes is responsible for the remark which he had uttered about half a century ago : -

"If the whole materia medica could be sunk to the bottom of the sea, it would be all the better for mankind and all the worse for the fishes."

2. Dr. Baillie of London says : -

"I have no faith whatever in medicine."

3. Professor Evans, Fellow of the Royal College of London says :--

"The medical practice of our day is at the best *a most uncertain and unsatisfactory system : it has neither philosophy nor commonsense to commend it to confidence.*"

4. Benjamin Rush, M. D., formerly Professor in the First Medical College in Philadelphia, says :—

“I am incessantly led to make an apology for the instability of the theories and practice of physic. Those physicians become the most eminent, who have most thoroughly emancipated themselves from the tyranny of the schools of medicines. *Dissections daily convince us of our ignorance of disease and cause us to blush at our prescriptions.* What mischiefs have we not done under the belief of *false facts and false theories* ? We have assisted in multiplying diseases ; we have done more ; *we have increased their fatality.*”

5. Professor Gregory of Edinburgh, Scotland, says :—

“Gentlemen, *ninety-nine out of a hundred medical facts are medical lies, and medical doctrines are, for the most part, stark, staring non-sense.*”

6. Dr. Ramage, Fellow of the Royal College, London, says :—

“It can not be denied that the present system of medicine is a burning shame to its Professors, if indeed, *a series of vague and uncertain incongruities deserves to be entitled by that name.* How rarely do our medicines do good ! How often do they make our patients really worse ! *I fearlessly assert, that in most cases, the sufferer would be safer without a physician than with one.* I have seen enough of the malpractice of my professional brethren to warrant the strong language I use.”

7. The Dublin Medical Journal writes :—

“Assuredly the uncertain and the most unsatisfactory art that we call medical science, is no science at all, but *a jumble of inconsistent opinions ; of conclusions hastily and often incorrectly drawn of facts misunderstood or perverted ; of*

comparisons without analogy ; of hypothesis without reason and theories not only useless but dangerous."

8. Sir John Forbes M.D., F.R.S., Physician to Her Majesty Queen Victoria, says—

"Some patients get well with the aid of medicine, more without it, and still more *inspite of it*."

9. John Masson Good. M. D., F. R. S., says --

"The science of medicine is a barbarous jargon and the effects of our medicines on the human system are in the highest degree uncertain, except, indeed, that they have destroyed more lives than war, pestilence and famine combined."

10. James Johnson M. D., F. R. S., Editor of the Medical Chirurgical Review remarks—

"I declare as my conscientious conviction, founded on long experience and reflection, that if there was not a single physician, surgeon, man-midwife, chemist, apothecary, druggist, nor, drug on the face of the earth, there would be less sickness and less mortality than now prevail."

11. Professor C. A. Gilman M. D. of New York College of Physicians and Surgeons says—

"Nineteenth of the disease to which flesh is heir is due to abuse of allopathic medicine in infancy or childhood."

12. Professor W. Parker M. D. of the same school writes :—

"Of all the sciences, allopathy is most uncertain."

13. Asking "Why do we give drugs?" Dr. James Fred. Goodhart M.D., LL.D., F.R.C.P., (*British Medical Association* 1901,) says :—

"Often not because the disease demands it, but because the

patient is not happy till he gets it, too often he is not happy even then. They are sometimes given to hide our ignorance, I fear, or to mark time while we watch and wait. They are sometimes given as a gambler on the Exchange speculates in 'futures,' an enhanced reputation being the windfall that it is hoped to secure, and then we often give drugs as an experiment in the hope that they may do good."

14. Sir Richard Douglas Powell Bart M.D., K.C.V.O., F.R.C.P., remarks :—

"In spite of all that we hear of our progress in medicine we can not cure a common cold."

15. Sir Frederick Treves Bart, G.C.V.O., C.B., M.D., LL.D., F.R.C.S. quite recently has said :—

"The time will soon come when drugs and medicines will be a thing of the past."

16. Sir Dyce Duckworth M.D., LL.D., F.R.C.P., in the course of an address delivered before the Faculty of Medicine of Paris, has said :—

"We are, I much fear, suffering in these days from a widely-spread spirit of incredulity, timidity and helplessness in the whole realm of therapeutics. We spend more time in cultivating elaborate diagnosis, but we grievously neglect our main business as healers and mitigators of disease. But why ? Why should we lay ourselves open to the charge that we actually "neglect our main business ?" The real secret of the therapeutic apathy which is pervading our ranks is the lamentable, but none the less indisputable, fact that we have no *materia medica* worth the name."

17. Prof. William Osler, M.D., D.Sc. LL.D., F.R.S., F.R.C.P., (*British Medical Journal of July 24, 1909.*) reminds us that each generation has its therapeutic vagaries :—

The author would, on the one hand, imbue him with the firmest faith in a few drugs, "The friends he has and their adoption tried," on the other hand he would encourage him in a keenly skeptical attitude toward the Pharmacopœia as a whole, ever remembering Benjamin Franklin's shrewd remark that "he is the best doctor who knows the worthlessness of most medicine."

18. The writer remarks that in his college career he had learned hundred medicines in a single disease, but after a bitter experience he scarcely finds a single medicine in hundred diseases, and further adds "Prescribing is like shooting in the dark, sometimes you hit, more often miss."

Welcome one and all of those who will read these notes to think and say what they like about it. The bare, unvarnished truth is that we have no materia medica worth the name. What we do have is an endless and bewildering list of drugs, old and new, without the shadow of anything like a principle to guide us in the selection of them as medicinal agents : with a certain amount of information as to how they are obtained, how they act on guinea-pigs, rabbits, etc., but when we come to their action on the human organism we are told that they "may" do this or that, "may" be useful in this or that, and that they "are said" to have done this or that, but on the whole, nothing certain, nothing definite, nothing positive, no remedy, in short, with the exception of old identities.

An old practitioner once said :—

“There are only two drugs of which I am sure, one is opium and the other castor oil.”

A great man has said :—

“To electrical forces and animal serums and extracts must we look in the future in all probability for the remedies to combat many diseases, now called incurable.” Looking back ten years we can note many new and wonderful discoveries. Some of them have overturned law which seemed as fixed as the hills.

The writer summarises the commonest arguments against medicine viz :—

- (i) Drugs do not cure.
- (ii) Drugs are of no use.
- (iii) Drugs act only as poisons.

To this the writer can only reply in the negative.

Have we not seen in our daily practice how syphilitic lesions melt away under the administration of mercury and iodides or “606”, how malaria disappears as if by magic under a properly administered dose of quinine or arsenic, how rheumatism flies before salicylate, how a dwarfed imbecile cretin grow in stature and gain intelligence from day to day under the treatment of thyroid, how a water-logged old creature unable to stir a step without getting out of breath takes on a new lease of life under digitalis, how a diphtheritic membrane rolls away as if by the touch of a magic wand after a dose or two of antitoxin, how the pale cheeks of the anæmic girl change into red roses under the administration of

iron and arsenic, how a few drops of amyl nitrite has the life-saving effect in an attack of pseudo-angina pectoris and so

It is the abuse of medicine that is to be blamed.

The writer takes the liberty of quoting the shrewd remark of Prof : George B. Wood M.D., LL.D., of Philadelphia who says : —

“Show me a man who says drugs are of no value in the treatment of disease, and I will show you a man who does not know how to use them.”

He further adds :—

“First on animals, then on myself, then on my wife, then on my patients, I employ the new drug. I then give the facts to the world.”

In conclusion we as physicians, should use medicine very cautiously when one is out of health but must be always on the alert when to stop it, and then put him under tissue remedy to supply the deficiencies of cell salts of our body, but at the same time bearing in mind the influence of mind power over the body. Subconscious mind is the great healing power within ourselves and is almost wholly unknown to us. It is needless to add that the physician should remember the physiologic actions and therapeutic uses of drugs, their proper doses, their indications and contra-indications.

CHAPTER II.

THE CYCLE OF LIFE.

"Art Longa ; Vita Brevis"

(Art is long; Life is short.)

Life is like a cycle rolling on and on through eternity whose begining is wisdom and end is admiration. We have to deal here that portion of the cycle of life which comes in contact with our existence in relation to this world. It is like the arc of a circle illuminated by a celestial light, the other part remaining in the dark. So long we exist we have a relation with this world; when we cease to exist or in other words when we shuffle off this mortal coil our soul separates from our body and "like a dewy drop slips into the shining sea." (The Light of Asia) and thus the relation between soul and body is separated. The former is immaterial, hence immutable the latter is material and therefore mutable.

The cycle of life embraces two phases of our existence:—

(1.) Intra-uterine.

(2.) Extra-uterine.

Intra-uterine period extends from ovular fermentation till birth i. e. an approximate course of nine months and ten days ; the foetus is dependent on another life the mother : her pure or poor blood affects the offspring materially *e.g.* if the mother be in capital health the child will be hale and hearty, if she be suffering from wasting disease there is every likelihood of the child being weak and

debilitated, if the parents have syphilis they invariably impart it to their children. Hence it should be the look-out of every house-hold to feed pregnant women with easily digestible plain food, to drink pure water, to wear suitable clothes to the season and to avoid fatigue both physical and mental :

Extra-uterine period extends from birth till death ; it involves four stages of life.

1. Infancy.
2. Childhood.
3. Youth.
4. Old age.

1. **Infancy** : --

A new born babe should be strictly on her mother's milk ;

If the mother be diseased a healthy wet-nurse should milk the infant.

Mother's milk is considered as the ideal food and some of the best artificial foods are prepared on this line only. It contains all the necessary principles requisite for the maintenance of life and growth of the body in a suitable proportion. Thus it contains nitrogenous matter, carbohydrate, fat and salts all combined together in a fluid medium.

Its composition being

Proteins	...	1.62	per cent.
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Carbohydrate	...	6.26	..
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Fat	...	3.14	..
-----	-----	------	----

Salts27	..
-------	-----	-----	----

Water	...	87.75	..
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Unknown Extractives91	..
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Fortchr. der. Med. BD 15, No. 241897.

The requirement of a healthy infant as observed by Profs. Camerer and Fée on an average is as follows :—

During 1st to 2nd month ...	600	grams of milk daily	20 oz.
2nd to 4th ...	800	...	27 oz.
5th to 7th ...	950	...	32 oz.
7th to 9th ...	1020	...	34 oz.
9th to 12th ...	1150	...	39 oz.

Holt—Infant feeding (Diseases of children.)

A few Practical hints about Infants.

1. Don't forget to examine genitals and anus of a new born babe. There may be cases of imperforated genitals or anus.

2. Don't cut the cord too close; the cord should be tied from 1½" to 2" from the surface of the abdomen. The writer has seen fatal cases resulting from sheer folly of the midwife.

3. Don't give the newborn child milk until the third day. He may be placed to the breast and allowed to nurse if he will, but many of them won't. In the meantime, give him a little pure water occasionally throughout the day. Follow Nature's Law. Forcing a child to drink milk during each act of crying on the thought that the child is hungry leads to gastric catarrh.

4. Don't allow the mother to nurse the child after the third day until she cleans her hands thoroughly, presses a little milk out of the breasts and rubs it over the nipple.

5. Don't give any medicine to the mother except malt

extract with meals, if the milk seems slow in coming and of a poor quality.

6. Don't give the baby paregoric to quiet him, although you will feel like doing so. Use castor oil, infant's anodyne.

7. Don't omit placing the head of the baby over a pillow stuffed with mustard seed. It keeps the head warm.

8. Don't forget to put the child in the sun or sunshade for two hours at least a day.

9. Don't forget to bathe the child every third day after rubbing the body well with pure mustard oil.

10. Don't forget to dust the cord with salicylic acid one part, starch four parts, and it will come off sooner. But don't worry if it stays on a week or eight days if it is aseptic.

11. Don't forget to remember that persistent bleeding from the navel usually means hereditary syphilis and usually is fatal.

12. Don't be presumptuous. Listen to what the old women tell you. Sometimes they will say something worth while.

13. Don't permit anyone to kiss the baby on the mouth.

14. Don't feed the baby with farinaceous articles like barley etc., as amyllopsin ferment of pancreatic juice is in a dormant state though ptyalin ferment of saliva is in working order; but a baby gulps down the liquid without chewing hence ptyalin ferment has very little use or none whatsoever.

The Curative Powers in Human Milk.

Dr. Sajous adds :—"There is something to be thought of in the composition of milk besides mere proteid, fat, carbohydrate, salt, and water. The additional factors, largely overlooked until the last few years, include the passage through the normal maternal milk to the child of special substances, inherent in the species, which assist the offspring not only in the proper treatment of the food-material embodied in the milk, but also in carrying on other bodily functions, including that of protection against infection.

Profs : Ehrlich and Brieger demonstrate in their experiments on mice, "That milk is capable of conveying antitoxic substances." It is found that the young are thereby rendered immune to the poisons employed, viz., ricin, abrin and tetanus toxin. This immunity steadily increases during the period of lactation persists for some time after, and then gradually disappears."

Profs : Schmid and Pflantz, enunciate the conclusions that (1) antitoxic substances found in the blood of parturient women exist also in their milk ;

(2) The quantity of antitoxic substance excreted with the milk is much less than that found in the blood.

Dr. Moro enlightens us that the bactericidal power of the serum of the blood in breastfed children is distinctly greater than in those artificially fed.

To a "hand-fed" child *under one month* the following are recommended :—

1. Ass's milk.

2. Cow's milk one part, water two parts, a little sugar of milk and *albumactin.

The habitual use of milk sterilized at a high temperature.

(1) causes dephosphatisation (phosphorus inanition); this being the underlying mischief in both rickets and scurvy rickets.

(2) destroys citrate of calcium in the milk, the assimilable form of the phosphorus compounds.

Apart, then, from breast feeding, infants should be fed on plain milk, raw if we can make sure of its origin and freedom from contamination, otherwise use simply sterilized milk by boiling. Should this for any reason not be practicable, we may give plain sterilized milk—*i.e.*, milk that has not been otherwise manipulated; and in order to obviate as far as possible the gastro-enteritic disturbances that pave the way to rickets and scurvy, the infant should be given one or two tablespoonfuls a day of the following solution:—

R

Citrate of Soda, 80 gr.

Boiled water, 10 fluid oz.

*Prof. A. Bickel and Dr. H. Roeder, of the Royal Pathological Institute in Berlin, remarks that:—

Albumactin is the soluble form of milk-albumin, or the real albumin of milk as distinguished from the casein. This substance is now recognised as being not only the essential nutritive element in human milk, but also the chief cause of its easy digestibility. Human milk contains three times as much of it as cow's milk. By adding the right proportion of milk-albumin, or Albumactin, to diluted cow's milk, a milk is obtained practically identical with the human fluid.

To a "hand-fed" child *under six months* the following combination acts well :—

Cow's milk two parts, water one part, a little sugar of milk and albulactin.

N.B.—A. If the child be weak and anæmic add fresh cream to the milk.

B. If there be symptoms of scurvy give freshly made raw meat juice or fresh fruit juice of oranges, pomegranates etc., to supply anti-scorbutic element to the system ; it is normally present in healthy human milk.

To a "hand-fed" child *from nine months upwards* the following are ideal combinations : —

1. (a) Boil cow's milk with little barley ; it mechanically strikes against the milk corpuscles during the act of boiling and thereby breaks them asunder into finer particles like that of human milk ; moreover the child can at this stage digest carbohydrates :

(b) Milk with Albulactin.

(b) Milk with Sodii citras.

2. Bread jelly three ounces, boiled milk four ounces, and water four ounces.

3. Bread jelly four parts, raw meat juice three parts, cream half part and a little sugar of milk.

4. Malt in the shape of Mellin's food, etc. is highly nutritive.

- N.B.—1. Don't tax child's stomach with artificial condensed milk.
2. Don't give peptonised milk in a routine fashion to a child for a considerable length of time, as it interferes materially with normal digestion.
 3. Don't add anything which is hot to raw meat juice as heat destroys its antiscorbutic property.
 4. Don't forget to boil milk especially in a temperate country like India, as fermentation sets in quickly.
 5. Don't omit washing feeding bottles with bi-carbonate of soda each time before use.

A bottle-fed child may be restored to fair and even vigorous vitality. While wasting in infants is largely due to faulty diet in its inception and continuance, yet when the atrophy has proceeded to a certain degree, a change to a proper diet is not usually sufficient to check the downward trend. The case requires, in addition, an altered environment that will furnish plenty of fresh air, good general hygiene, and individual care. The child cannot seem to assimilate the best of food without an abundance of good air to assist in its oxidation : *oxygen is as necessary for him as protein or fat.*

Gastro-enteritis of Bottle-fed Infants.

PROPHYLAXIS.—

1. Give clean milk fresh from cow to drink.
2. Allow fresh air to breathe.
3. Avoid overheated rooms. In hot weather child should be placed out-of-doors at night on properly screened porch.

4. Avoid overfeeding.
5. Give boiled water to drink.
6. Have light clothing and frequent cool bathing.
7. Destroy flies.

TREATMENT.—

1. Withhold food for three days : then give barley water.
2. Have child rest quietly in bed out-of-doors.
3. Tub-bath, lasting 10 to 20 minutes, to control temperature and restlessness.
- 4.

R

Bismuth carb	gr. ii
Salol	gr. 4
Sac Lactis	gr. iv

Mft. for a pulv : Sig : one twice a day.

Childhood : —

The infant now passes into childhood and requires additional food ; this is supplied by cow's milk in addition to mother's as it grows and pancreatic secretion is established. It also does more muscular work and needs more supply of carbohydrate food ; but early addition of carbohydrate or fat in the body is harmful. The child is now entering through the gateway to reach adolescence, and consequently it wants a good deal of nutrition for the growth of its bones and the activity of its muscles : appropriate nutrition is required for the nourishment of brain and nervous tissues and the food of human being becomes gradually complicated. Then comes

the desire to satisfy the palate and the choice to do so depends on the circumstances in which the individual is placed—somebody pinching for food while others living in luxury and plenty.

Sound health and proper education (moral and intellectual) are so to speak the arms of an ideal man; consequently to wrap up the child in an atmosphere of tenderness and care, and to bring him up with a silver spoon in the mouth, are not the index of paternal love in the truest sense of the term; for the benefit of health the child should be allowed to play, to run, to jump etc., with proper dress suitable to the season; diet should be nutritious and generous; there should be very little restriction about diet; a healthy child can digest even a stone; in conclusion allow him to be a Nature's Son.

“To the solid ground of Nature
Trust the mind which builds for aye.”

Wordsworth.

To look after the education of children, is the first sacred duty of a father; teach him yourself if circumstances allow and try to make a man of him.

“The situation of man is the preceptor of his duty”

Burke.

Artificial life is the harbinger of so many diseases of childhood; root out “artificialism” and there should be no infantile liver in the dictionary of diseases. The writer quotes from experience that infantile liver is rare amongst the poor labouring classes of people.

Child and Plant life compared.

The comparison of a child with a plant has value, only to the extent in which purely biological or physiological processes are concerned. The comparison falls short at the line of self-consciousness by which the child is lifted into a zone of development altogether unique in natural evolution. The growth of a plant involves only physical factors, while that of a child brings into operation the vastly more complex psychic and moral factors of education as expressed in examples, precepts, suggestions, personal ambitions, etc., which, while forming pivotal influences over child-life, exert no power over the plant. The plant is ephemeral and rooted in the soil, the child is rooted in the self-consciousness of its own eternal soul.

To secure the greatest success the child-culturist, in no less degree than the horticulturist, depends on an early start. "Give me the child from his fourth to his tenth year," said *Prof. Froebel*, the great Swiss child-educator and father of the Kindergarten system, "and I shall feel safe about his citizenship"—a statement which, however, is flatly contradicted by Dr. Hutchinson in his assertion that "in nine cases out of ten, the child, prior to its tenth or twelfth year, is as far beyond the possibility of direct interference as the germ of the lily flowers in the heart of the stalk."

Father Froebel is right: Childhood stands for the spring-time of human life. The fluidic, plastic, receptive condition of the soil in the spring is not more indispensable to the success of agriculture than the receptivity and original nature of the mind in early childhood, for the cultivation of manly virtue and citizenship, and as

neglected plant-life gives rise to the tares and thistles—the stifling weeds of the agricultural field—so the neglected child-life will have to take its desperate chances of moral survival in the stifling atmosphere of the heterogenous influences brought to bear upon it by its contact with sin and vice in their thousand ways and guises of allurements. And furthermore, as the spring-time of the year furnishes the only opportunities for the planted seed to be caught by the let-loose vital processes of growth, while hurried onward towards development and fruition, so in the spring-time of childhood the parent or teacher has the unique and non-recurrent opportunity of life, to mould, to fashion, and to direct the destinies of the future man. The current of growth must be caught at its swiftest tides, at a time when the rushing momentum of liberated virgin energy furnishes the receptive vehicle for life's sole and sublime epoch of unfoldment.

First come, first served, is an adage no less applicable to moral than to commercial life; and if vice makes its appeals to childhood prior to virtue, the latter will, in most cases, find the door closed.

Our virtues, are hereditary while our vices alone are acquired—a product of education.

Every expression of the child-mind is natural, harmless and true.

Truth is to the mind what light is to the eye—a gauge and guidance—a medium for intellectual and moral vision.

If the child is healthy, he must take every favour that comes in the way, every expression of kindness and sacrificing

love as a "matter of right and course, just as the plants do the sunshine and the rain and the soil in which they grow." And of all the budding virtues of the normal child, his sense of appreciation and gratitude is perhaps the most prominent. For as every virtue of the grown man is already present in the child as vital seeds, ready to sprout whenever its environments permit.

"The child is father of the man."

Wordsworth.

And furthermore, as there can be no environment more apt to stimulate the growth of gratitude in the child than the boundless affection and selfdenying love of parenthood, by which it is constantly surrounded, it follows that there are greater opportunities and a more congenial soil for the development in childhood of that particular sweet virtue than of any other. For gratitude does not evolve like the colours and figures of a picture which the artist brings out with his brush, but rather like the tree which harbours the possibilities of growth in its own nature, unfolding as bud, blossom and fruit under the promptings of its own native powers and environments.

It is this fact that places the child and the parent in a most vital and mutually determining reciprocity. The inherent virtues of childhood are no more capable of development without the assistance of the parents than the latter are in eliciting those very virtues, if they be not already present as vital, though slumbering possibilities, in the child's mind. Hence, any neglect on the part of the parent to provide opportunities for the child to unfold its native

riches of character and genius retards or may even prohibit its moral evolution.

And finally, in grappling with the problem of child-education, are there not to be found a suggestion of deepest significance in the words placed on the lips of the sage of Nazareth :—

“Let the children come to Me, and prevent them not, for of them is the kingdom of heaven.”

Now let us compare the diet of an infant with that of an adult in India, Europe and America :

Indian standard

DIET OF INFANT OF SIX MONTHS.		DIET OF ADULT.	
Weight—	13 Kilos or 26 lbs.	Weight—	60 Kilos or 120 lbs.
Proteid	9 gram	Proteid	60 gram
Fat	22 ..	Fat	90 ..
Carbohydrate	47 ..	Carbohydrate	300 ..
Caloric value	450 ..	Caloric value	2250 ..

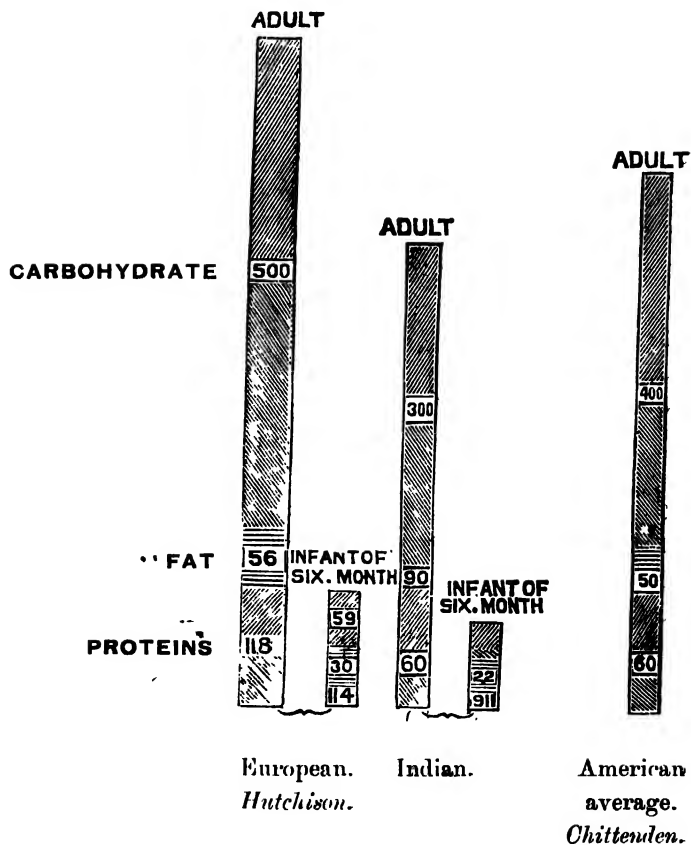
European standard as taken from Hutchison :

DIET OF INFANT OF SIX MONTHS.		DIET OF ADULT.	
Proteid	14 gram	Proteid	118 gram
Fat	30 ..	Fat	56 ..
Carbohydrate	59 ..	Carbohydrate	500 ..
Caloric value	578 ..	Caloric value	3054 ..

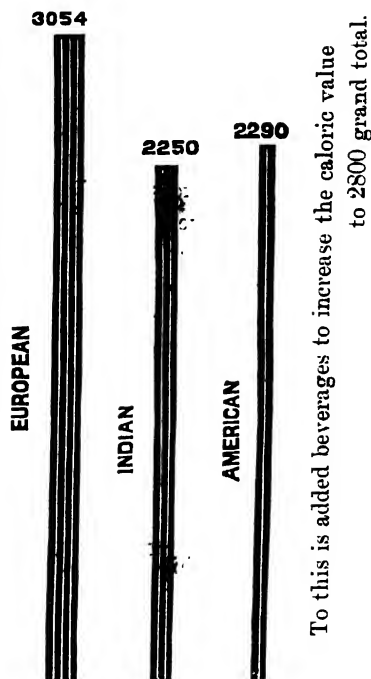
American standard as laid down by Chittenden :—

Proteid	60 gram
Fat	50 ..
Carbohydrate	400 ..
Caloric value	2290 .. (leaving out the consideration of beverages).

Graphic method of diets :—



Graphic method of diet (Contd.)



Caloric value of adult diet according to different races.

Total quantity of food taken by an adult.

EUROPEAN	746 grams or 24 oz.
INDIAN	450 ..
AMERICAN	510 18

Thus we have seen from experimental evidence, observed facts and Nature's indication that diet should not be taken in a haphazard way but in constant proportion from infancy to adult life. We may fill our system with anything that comes in our way, we may grub whatever our palate may come in contact with, but a time may come when we may have to repent for it. Excess in diet may be apparently beneficial but it is positively harmful in the long run. Intemperance in diet is liable surely to be followed by disaster. But temperance in diet like temperance in other matter leads to good results and physiological evidence points out clearly, like a signpost all can read, that there is no demand on the part of the body for such quantities of food as custom and habit call forth. Healthfulness and longevity are the prizes awarded for the successful pursuance of a temperate life modelled in conformity with Nature's laws.

Finally, in words of Christenden we may triumphantly say that nutrition of man, if it is to be carried out by the individual in a manner adopted to obtaining the best results, involves an intelligent appreciation of the needs of the body under different conditions of life and a willingness to accept and put in practice the principles that scientific researches have brought to light even though such principles stand opposed to time-old tradition and custom. The master words which promise help in the carrying out of an intelligent plan of living are *moderation and simplicity*; moderation in the amount of food consumed daily, simplicity in the character of dietary, in harmony with the old saying—that—

MAN EATS TO LIVE AND NOT LIVES TO EAT.

A tall well framed child looks better than a stunted one; hence the question may be naturally asked

HOW TO GET TALL.

It is said that no man "by taking thought can add one cubit unto his stature." Apparently, however, there are other ways of accomplishing this desired result. Marion Harland, answering an inquirer in the *Chicago Daily News*, tells how stature may be added to, as follows:—

"When you rise in the morning, and after the bath, rise upon your toes and stretch the tips of the fingers up toward the ceiling as far as they will go; sweep your hands over front, touching tips of fingers and the flat of the palms to the floor, keeping the knees straight. Repeat these exercises three or four times daily, keeping them up for ten minutes at a time, standing on tiptoe with arms up at full length as long as you can bear the strain. Persevere and you will surely gain in stature. I know of a youth of 22 who grew two inches a year by doing this."

Youth.

Before parading about Youth --the primrose of life --the spring of season --the writer thinks it best to narrate briefly something about the **Physiology of Digestion**.

Our digestive tract extends from the mouth to rectum. There are five kinds of secretions viz saliva in mouth, gastric juice in stomach, pancreatic juice and bile in duodenum, and succus entericus in intestine.

Saliva is composed of three kinds of secretions viz solids from sublingual, mucin from submaxillary, and ptyalin from parotid glands. Mucin lubricates the bolus of food and ptyalin splits up starch granules into dextrin and

maltose; dextrin is subsequently converted into maltose. Saliva has no action on cellulose the covering of starch grains, hence the importance of cooking; it mechanically splits up cellulose layer of starch grain, and starch granules into finer particles:

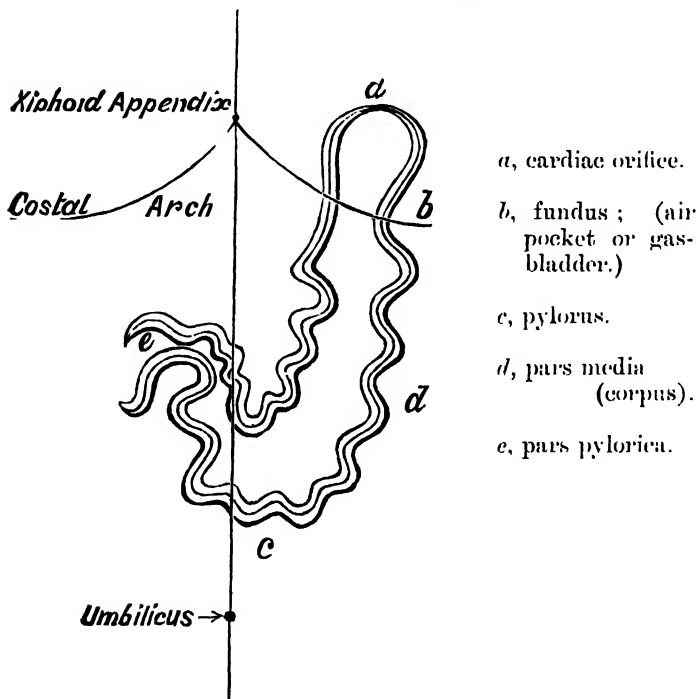
Gastric juice secretes pepsin which acts on proteid and reduces it into hemi-peptone and anti-peptone: the anti-peptone is further converted into peptone.

Cellulose layer of cereals are dissolved by it.

The stomach is considered as the "digestive machine," with three compartments, namely, the fundal portion which is used for storing the food, for secreting the gastric juice, and as a sort of active reservoir which gradually squeezes its contents into the second or pyloric division, which, when functionating, is intestiniform in shape and is possessed of thick firmly contracted walls. This part of the "digestive machine" is by far the most active, its contractions being powerful, and consequently it is the region most frequently exposed to injury from within. It is separated from the third compartment of our "digestive machine" by the pyloric valve, which is so constituted that it opens reflexly to waves of constriction approaching it on the proximal side and closes reflexly in the presence of free acid on its distal side: but while the chemical condition of the contents on its distal side largely controls the pyloric sphincter, yet the pylorus has some selective action as to the length of time certain varieties of ingested material remain in the stomach. The third or duodenal segment combines the chyme or food which has passed through the pyloric valve with the bile and pancreatic juices; it is therefore a mixing apparatus like the first.

An Examination of the stomach under x Rays.*(During life.)*

In the ordinary course the *stomach is transparent under X Rays*, and in order that the picture may be obtained, the patient is made to swallow a *solution of bismuth*, which, spreading over the walls of the stomach, has rendered it opaque and has resulted in a perfect sharply-impressioned negative. The moment food is ingested, and particularly bismuth the stomach endeavours to evacuate its contents and the exaggerated vertical posture of the organ is manifested.



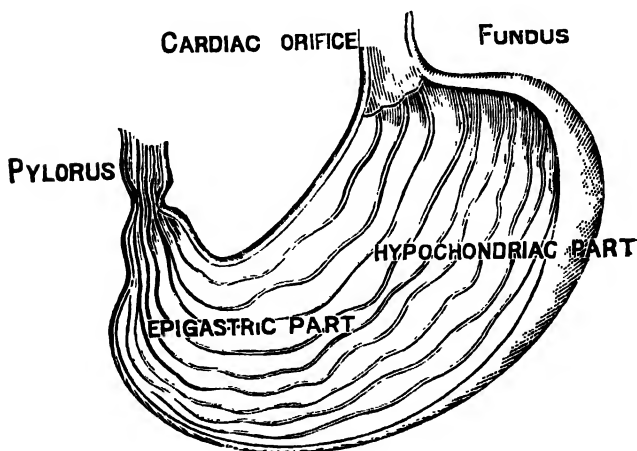
An Examination of the stomach

(During life) contd.

The walls of the stomach are in motion, the movements thus produced are called peristaltic, and are due to the undulating muscular contractions of the triple envelopes of the organ; such movements complete the work of softening and reducing the food to pulp, which has already been commenced in the mouth, and is in addition to that performed by the digestive juices. Stomach is palpably different in life from what it is in death; in a *living person* it is more *cylindrical in shape* than it is after death, and when aliments are in it a space full of gas exists above them; this space, or airpocket, appears much lighter in the negative.

An Examination of the stomach.

(After death)



Stomach during life.	Stomach after death.
1. Vertical in position.	1. Horizontal in position.
2. Cylindrical (ox-horn) in shape.	2. Hammock in shape with the larger curvature as a deep pouch.
3. The pylorus represents the most dependent part of the stomach.	3. The pylorus is only a little below the cardiac orifice opposite the first lumbar vertebra.

Pancreatic juice secretes four kinds of ferments viz : --

1. Trypsin which acts on hemi-peptone and decomposes it into leucine, tyrosine, arginine, aspartic acid and ammonia.
2. Amylopsin which acts on starch granules.
3. Steapsin which acts on fat (emulsion and saponification).
4. Rennet which curdles milk.

Liver secretes or excretes according to some, bile which in combination with pancreatic juices, assists in all the above-mentioned actions, but acts mostly on fat

Intestine secretes succus entericus ; its ferment invertin converts canesugar and maltose into glucose.

Cell Metabolism.

A **cell** is the ultimate element of structure ; it enters into the formation of all tissues. It consists of a tiny mass of protoplasm, and contains a nucleus and an attraction sphere. but as a rule no cell wall. Cells vary in shape and size-

(from about 1-3000 to 1-300 of an inch in diameter), and are characterised by power of movement, assimilation, growth, excretion and reproduction.

Living material is in a continual state of unstable chemical equilibrium, building itself up on the one hand, breaking down on the other ; the term used for the sum total of these intra-molecular rearrangements is **Metabolism**.

Metabolism means chemical changes in living organisms which constitute their life, the changes by which their food is assimilated and becomes part of them, the changes which it undergoes while it shares their life, and finally those by which it is returned to the condition of inanimate matter. All the phenomena of life are at bottom chemical reaction.

The human body which represents the highest form of animal life, is literally a nation of cells derived from a single cell called the ovum, living together, but dividing the work, transformed variously into tissues and organs, and variously surrounded by protoplasm products.

Biologists of the present day may be divided into two classes : —

i. **Vitalists**

ii. **Non-vitalists.**

i. Vitalists believe all animal and vegetable existence to be endowed with some special unexplained force, which is the real essence of life, which causes all those phenomena characteristic of individuals who feed, propagate and die. This class of observers holds that man will never fathom the vital principle.

ii. Non-vitalists or the disciples of physico-chemical school endeavour to expound organic life by only those laws which hold good for the lower organic compounds.

M. G. Seelig states that vitalism concerns itself solely with the abstract thought that there is inherently resident in living matter a directing element or force that is not under the control of the known laws of physics or chemistry. Vitalism is the *testimonium paupertatis* of the scientist, his credo expressed in terms of honest agnosticism. Antipodal to this doctrine of the inscrutability of the fundamental basis of life stands the dogma of the nonvitalist; that since many of the phenomena of life conform with the laws underlying the properties and actions of inorganic bodies one has every reason to assume that the sum total of activities constituting life is as much subject to the laws of chemistry and physics as is the sum total of activities of gunpowder or of the threshing machine. According to this view the human body is a machine, not only in the sense that its activities are directed toward a purposeful end, but also in that each step toward the accomplishment of this end is predicated upon a definite axiom. The sum total of these axioms constitutes the great body of natural law. There are, says the nonvitalist, many axioms still in the crucible of proof, many still unguessed; but the result of the final assay will invariably be the disclosure of a principle as essentially mechanical, physical or chemical as are the already established laws of the inorganic world. The assumption of an intangible, immeasurable vital force is, according to the doctrine, unnecessary and, to say the least, uninspiring.

The writer thinks it best to bridge over the gulf existing between the two schools.

The three functions of the body which form the vital tripod are those of **cerebration, circulation and respiration**. Of these the first two are but rarely attacked by disease, for the reason that they are carefully guarded from outside invasion, having no direct communication with external influences. The lungs, on the other hand, although equally vital in their office, are patently and directly related to the common sources of infective invasion, and easily fall a prey to their ravages. Of all the organs, indeed, that are open to such invasion and devastation, the lungs are the most vital and indispensable, and the least amenable to artificial compensation.

Digestion, metabolism, elimination, sensation, motion all of the other functions which are subject to compromise by disease, may be temporarily dispensed with, in whole or in part, without necessarily fatal result, and moreover they are susceptible of more or less artificial compensation by some kind of a flank movement on the part of the therapist.

Fools rush in where angels fear to tread ; and a layman who has acquired a microscopical amount of knowledge relating to health is prone to magnify the importance of the small amount of light with which he may be illumined.

The health of the body depends wholly upon perfect metabolism.

But perfect metabolic function, depends upon four main factors :—

- (1) the air we breathe ;
- (2) the exercise we take ;
- (3) the things we eat and drink ;
- (4) the way we digest them.

Now presupposing we breathe pure air in copious quantities (which presumes a sufficiency of exercise) ; and again presupposing we eat the right kind of food both in quantity and kind, and digest and assimilate it properly, metabolic processes would be perfect and health would be maintained. Conversely, before disease appears, there must be some deficiency either in the quantity or quality of the air we breathe, or some error in our choice of food, or something lacking in the way we digest it. But both air, food and digestion correlate in the effect they produce upon the blood, and therefore it might be asserted that, if the purity of the blood be preserved, metabolic processes are carried on efficiently and health is maintained.

The poet has well sung :—

“I sigh not for beauty, nor languish for wealth ;
But grant me, kind Providence ! virtue and health :
Then, richer than kings and more happy than they,
My days shall pass sweetly and swiftly away.”

TO AID DIGESTION.

Digestion is a process of chemical disintegration, secretion, selection, rejection and absorption. It is an entirely subconscious process.

The writer formulates the following methods :--

1. Hot soup at the beginning of a meal is highly recommended. It contains extractives and aids the flow of appetite juice.

2. Lean meats, eggs and milk, should not be taken at the same time with starches and fats.

The albumins require stomach digestion, and the starches and fats salivary, biliary and pancreatic digestion.

For these reasons persons of weak stomach digestion are benefited by taking lean meats finely divided, and separate from breadstuffs and starchy vegetables. Meats, eggs and milk taken by themselves as the first part of a meal, with an interval of fifteen or twenty minutes before other articles of food are taken, will be found to be much more nutritious than when taken mixed in with starches, etc.

The stomach movements are also thus improved and constipation avoided.

This plan of taking food is physiologically correct and practical when the habit is once formed.

3. Fruit should be the last article of diet.

4. Water should as a rule be avoided except a few sips from time to time to lubricate the throat and gullet. It dilutes the gastric juice and thus interferes with digestion ;

but it should be taken about half to one hour after meal when there is a great demand of it in nature.

The Metabolic Influence of Copious Water-Drinking with Meals.—Fowler and Hawk of the laboratory of physiological chemistry of the University of Illinois report the results of an exhaustive series of experiments, and conclude as follows : --

- (1) An increase in body weight, aggregating two pounds in five days.
- (2) An increased excretion of urinary nitrogen, the excess nitrogen being mainly in the form of urea, ammonia and creatine.
- (3) A decreased excretion of creatine and the coincident appearance of creatine in the urine. The decreased creatinine output is believed to indicate that the copious water-drinking has stimulated protein katabolism. The appearance of creatine is considered evidence that the water has caused a *partial* muscular disintegration resulting in the release of creatine, but not profound enough to yield the total nitrogen content of the muscle. The output of creatine is, therefore, out of all proportion to the increase in the excretion of total nitrogen.
- (4) An increased output of ammonia which is interpreted as indicating an increased output of gastric juice.
- (5) A decreased excretion of faeces and faecal nitrogen, the decrease in the excretion of faecal nitrogen being of sufficient magnitude to secure a lowered

excretion of both the bacterial and the non-bacterial nitrogen.

- (6) A decrease in the quantity of bacteria excreted daily.
- (7) An increase in the percentage of total nitrogen appearing as bacterial nitrogen.
- (8) A lower creatinine coefficient.
- (9) A more economical utilization of the protein constituents of the diet.
- (10) The general conclusion to be reached as the result of this experiment is to the effect that the drinking of a large amount of water with meals was attended by many desirable and by no undesirable features.

The question of food :-

The chief chemical compounds or proximate principles in food are :

1. Organic		Proteins.
		Carbohydrate.
		Fat.
2. Inorganic		Water.
		Salts.

N.B.—In nature you find 1. Proteins in the shape of myosin in muscle, casein milk, albumin in egg, gluten in bread and fibrin in blood

2. Carbohydrate in vegetables
3. Fat in the form of
 - (i) animal fat in milk and animal body
 - (ii) oil in vegetable seeds

An ideal Hindu diet :—

1. Rice rich with carbohydrate.
2. Dal and fishes rich with proteins
3. Ghee full of fat.
4. A pinch of salt.
5. Water.

An ideal European diet :—

1. Bread rich with carbohydrate.
2. Meat rich with protein.
3. Butter full of fat.
4. A pinch of salt.
5. Water.

Food Destination :—

1. Proteins.
2. Carbohydrate.
3. Fat.

The Fate of Proteins in the body.

The chemical substances in the protoplasm which are the most important from this point of view are the complex nitrogenous compounds called Proteins.

Chemistry of the Proteins :—

- i. Of the animal kingdom *e.g.* myosin, serum albumin, egg albumin, casein etc.

ii. Of the vegetable kingdom *e.g.* gluten etc.

It is still a far cry to the goal of our investigation viz : the solution of the constitution of proteins. The present efforts in connection with the chemistry of proteins are all essentially directed, on the one hand towards a determination of the nature and quantity of the smallest "building stones" (amido-acids, etc.) on which the large protein molecule is built up, and on the other, to a characterizing of the greater molecular complexes (peptones, albumoses), the intermediate products from which the building up of the protein molecule in its smallest stages proceeds. Nature provides in the animal kingdom most concentrated nitrogenous food in the shape of meat and beef which being rich in proteins head the list.

The chief solid constituents of meat are :—

- i. Myosin,
- ii. Extractives.
- iii. Salts, etc.

Composition of various kinds of meat compared.

	Protein.	Extract.	Caloric in one ounce.	Purin.
Beef	34.10	7.50	65.3	1.10 2
Mutton	25.	20.70	84.3	0.96
Chicken	17.60	11.50	54.5	1.20
Ham	20.20	22.40	82.5	1.10

Von Noorden on *Metabolism
and Practical Medicine* vol. iii

Protein contains	{	16	per.	cent	of Nitrogen.
		52	„	„	„ Carbon.
		7	„	„	„ Hydrogen.
		23	„	„	„ Oxygen.
		5.2	„	„	„ Sulphur.

Nucleo protein contains in addition small amount of phosphorus in organic combination.

The fate of the protein :—

As a result of katabolic processes in this human machinery proteins (meat &c) are in the process of digestion broken up by hydrolysis into cleavage products (simpler substances) in successive order of formation viz :—

- (i) Proteoses.
- (ii) Peptones.
- (iii) Polypeptides *i.e.* short linkages of amino-acids.
- (iv) Individual amino-acids.

Chemistry teaches us that a body may in a fluid remain under three conditions viz :—

- (i) In solution.
- (ii) In suspension.
- (iii) In colloidal solution—a condition intermediate between true solution and suspension.

N. B. Peptones are soluble ;

Proteins (except peptones) are colloids ;

They pass with difficulty through animal membranes. Ammonia is a product of protein metabolism ; it is produced

in relatively large quantities in the digestive tract, and carried thence by the portal vein and other channels to the tissues of the body, hence tissue remains *alkaline* and finally ammonia is split off into molecular parts. This leads to the study of another factor viz the formation of acid within the cell.

As soon as the amount of acid produced exceeds the amount necessary to neutralize the stored-up ammonia, or other alkali. "autolysis" sets in, and nitrogenous equilibrium ceases to be maintained. In order, therefore, to maintain nitrogenous equilibrium, nitrogenous food-stuffs must be ingested in such qualities and in such form that the ammonia produced therefrom in the digestive tract is sufficient to maintain the intra-cellular alkalinity of liver and probably other tissues.

When the production of acid exceeds the amount of ammonia available for neutralization, the autolytic enzyme comes into play, liberates amino-acids etc., which in their turn pass to the alimentary tract, and by means of the metabolic processes taking place they liberate ammonia, which again inhibits the production of nitrogenous degradation products.

Agencies which inhibit oxidation leads to the accumulation of lactic or other organic acids in the tissues, which under healthy conditions are oxidised further into carbonic acid. By this means an increased nitrogenous output is produced and equilibrium ceases to be maintained.

Theories of absorption of the Proteins :—

They are two :—

(i) Old theory.

Proteins are absorbed by the columnar epithelial cells that cover the surface and lymph cells in the lymphoid tissue beneath as peptone ; within the cells the peptone is transformed into soluble albumin and soluble globulin ; they circulate in the blood as such and not as peptone.

(ii) New theory.

Proteins are broken up into their constituent amino-acids ; they are absorbed as such and circulate in the vital fluid of the body.

Circulation of absorbed proteins through the blood : -

The absorbed proteins are finally carried to the terminal end of the circulation, viz : -

- (i) To the tissue for nutrition.
- (ii) To the alveoli of lungs for oxygenation.

Destination of absorbed proteins to the tissue : -

Metabolism comprises two fundamentally distinct processes, viz : -

- (a) Anabolism or assimilation.
- (b) Katabolism or dissimilation.

These, though distinct may be concurrent in the one cell. In proteid food stuffs anabolism precedes katabolism.

Prof. Schafer (*Text book of Physiology Vol. i. Page 898*) remarks :—

“Metabolism may occur both as a splitting up and oxidation of the molecules of living tissue, and as a splitting up and oxidation both of unorganised proteid and of non-proteid materials outside, but in contact with, the molecules of bioplasm. Such a view.....is consistent with all

the known facts and is.....readily applicable to the phenomina, both of animal and vegetable metabolism."

Every tissue of the body has an *erectic* action *i.e.* a particular natural selection of its own of nitrogenous material from the nutritive circulatory media and fixes them in self *i.e.* forming a part and parcel of it, and eliminates the waste product carbon di oxide and ammonia which is combined in the blood as ammonium carbonate; in the liver it undergoes dehydration and is transformed into Urea. In other words the amino-acids (leucine, tyrosin) are absorbed by columnar epithelial cells of the villi, pass through the blood as such: each tissue assimilates that particular *amino-body* which is essential for its own use *e.g.* tyrosin and phenyl-ananine are the useful "building stone" to the chief body protein: The waste "building stone" are converted into urea in the liver and excreted through kidneys as Exogenous urea.

The end stage of endo-genous katabolism of proteid is creatine, a substance found in the muscle: it is conveyed to liver and converted into creatinine. It is possible that a small quantity of tissue creatine may be converted into urea and sarcosine; sarcosine is converted into ammonium carbonate; then into carbamate and carbamide in the liver: This is called Endo-genous urea.

Thus we see there are in the body two forms of proteid katabolism essentially independent and quite different. One kind is extremely variable in quantity, while the other tends to remain constant. The variable form which Folin terms exogenous or intermediate metabolism, has its own particular kind of waste products, of which urea is the chief.

The constant katabolism, which Folin names endogenous or tissue metabolism, is largely represented by creatinine and to a lesser degree by uric acid. The more the total katabolism is reduced, the more prominent become creatinine and uric acid, products of the constant katabolism : while urea as chief representative of the variable katabolism, becomes less conspicuous.

In almost every organ (except spleen, brain, intestine etc.) there exists proteolytic ferments which decompose the protein of the organs removed from the circulation, into leucin, tyrosin, glycocoll, xanthin bases etc.

N.B.—When the processes of proteid katabolism and proteid anabolism are evenly balanced, and when, consequently the output of urea is practically equivalent to the intake of protein, the body is said to be in nitrogenous equilibrium.

There are two causes for the decomposition of proteid in the body viz :—

- i. The work of the muscle.
- ii. Oxygen of the blood.

Laws of Nitrogenous katabolism and excretion :

1. Nitrogenous katabolism, nitrogenous excretion are largely determined by supply.
2. They are “nearly” independent of muscular work *i.e.* the quantity of nitrogen excreted by a man on a given diet, is practically the same whether he rests or works.

(*Stewart's Manual of Physiology. Page 457, 1899.*)

3. They are independent of external temperature.

(*F. Hare's Food Factor in Diseases Vol. I, Page 19, 1905.*)

These remarks apply not only to the metabolism of proteid but also to the excretion of urea, and to the metabolism of nucleo-proteid and to the excretion of uric acid.

End products of Nitrogenous metabolism :—

About 15 grammes of nitrogen are excreted daily on an average during health, and the most important nitrogenous constituents of the urine are :—

UREA—Normal urine contains $2\frac{2}{3}\%$. It is largely dependent on the diet. Exercise does not lead to any notable increase.

URIC ACID—It is excreted to the amount of 1 gramme a day. It is present in urine in the form of a quadriurate. It is increased after proteid diet. Uric acid is the end product of the metabolism of nuclein; hence it is possible that the destructive metabolism of the blood corpuscles, both red and white, may in part at any rate, provide the uric acid daily excreted. On this view, the increased excretion after meals would be dependent upon the rapid destruction of the leucocytes associated with the mechanism of absorption. It must be remembered, however that nuclein exists in the food as well as in the body.

(*Allbutt and Rolleston's System of Medicine Vol. iv. Page 294.*)

CREATININE—It is excreted twice as much as uric acid. It is derived from creatine of the food; it has also a tissue origin.

XANTHIN GROUPS—They are one of the end products of proteid metabolism.

ii. Destination of carbonate to the alveoli of Lungs for oxygenation.

Bohr's theory :—

From a biological point of view the results obtained by Bohr are of great interest, because "even a high CO_2 -tension of the blood in the lungs will exert no measurable influence on the absorption of oxygen by the blood on its passage through the lungs, and here the oxygen tension is high: but when the blood reaches the tissues, the oxygen tension becomes reduced, while simultaneously the CO_2 -tension is raised, and thereby the giving off of oxygen by the blood will be greatly facilitated, and therefore the amount of oxygen present in the blood will be made use to a much greater extent than would otherwise be the case. Haemoglobin of blood absorbs oxygen of air from air vesicle through the agency of iron-containing radical haematin and also moisture, and forms oxy-haemoglobin.

Oxy-haemoglobin is markedly acid, while haemoglobin is not, and methaemoglobin which contains the same amount of oxygen as oxyhaemoglobin but in much firmer union than does oxyhaemoglobin, is more markedly acid.

Oxyhaemoglobin is converted into reduced haemoglobin in contact with ammonia.

There is another product named carbonic oxide haemoglobin. The most characteristic property of the Co-haemoglobin is its great firmness, as the Co. is only given off with

great difficulty to the blood-pump. This gas by uniting with hæmoglobin forms a firm Co-hæmoglobin radical, and prevents the taking in of oxygen.

Blood as circulating Medium: -

Blood is alkaline in reaction. The carbonic acid and phosphoric acid of the blood are in a state of constant struggle for the possession of the sodium. The salts formed by these two acids depend on their relative masses. If carbonic acid is in excess, we get sodium carbonate ($\text{Na}_2 \text{CO}_3$) and mono-sodium phosphate ($\text{Na H}_2 \text{PO}_4$); but if the carbonic acid is diminished, the phosphoric acid obtains the greater share of sodium to form disodium phosphate ($\text{Na}_2 \text{H PO}_4$). In this way, as soon as the amount of free carbonic acid diminishes, as in the lungs, the amount of carbonic acid in combination also decreases; whereas in the tissues, where the tension of the gas is highest, a large amount is taken up into the blood, where it forms carbonates.

In excessive meat diet especially beef which contains the highest percentage of protein, the alkalinity of the blood diminishes and acidosis (*i.e.* flooding of the circulation and tissues with acids) ensues.

The cause of this is probably partly the acid nature of the decomposition products of the erythrocytes (lecithin) and partly the deficiency of oxygen, with the consequent increase in protein decomposition and the production of acid bodies (lactic acid).

Human tissues are able to protect themselves up to a certain point against an increased production of acids and their

toxic effects by neutralizing them with ammonia. Large quantities of the latter become combined with the acids and excreted in the urine.

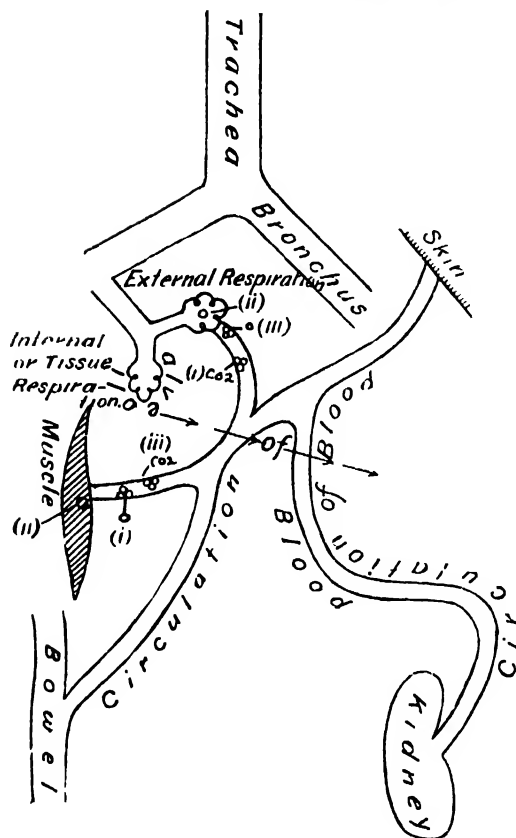
Effects of Acidosis :-

1. Tissue oxygenation is reduced.
2. Waste products of protein *Metabolism* (*urates, Xanthin &c*) accumulate in the blood and form fixed compounds not yielding to exchange.
3. Scurvy develops sooner or later; as a result of this
 - (i) Coagulability of blood diminishes, hence petichial hæmorrhages in subcutaneous and submucous tissues.
 - (ii) Nature tries her best to take calcium salts from bones to balance equilibrium, hence:
 - (a) Bones become spongy.
 - (b) Urine contains an excess of calcium salts.
4. Tissue becomes more vulnerable to infection especially to leprosy, tuberculosis and syphilis.

In conclusion as an article of diet beef especially high beef in a warm climate like India leads soon to acidosis; tissues become more vulnerable to infection especially to leprosy, tuberculosis, syphilis and skin diseases. Beef does not cause directly infectious diseases as we know at present they are caused by their respective germs, but it predisposes the tissues - prepares the soil—to become infected by any parasite.

A chart is herewith annexed.

The Destination of the End products of Protein Metabolism.



The following are excreted with the perspiration.

1. Carbonic acid gas exhaled is about 1/150-1/200 of that which passes from the lungs

2. Keratin rich in sulphur. This is one means by which sulphur is removed from the body.

3. Urea in minute quantity. It is quickly transformed into ammonium carbonate.

Diffusion of gases takes place until the percentage amount of each gas in each chamber is the same.

The following are excreted in the faeces:— 1. Keratin. 2. Indol. 3. Skatol. 4 Phenol.

The following are excreted in the urine:—1. Urea. 2. Uric Acid. 3. Kreatinin. 4. Xanthin groups. 5. Chlorides, sulphates, phosphates.

Personal Experience :—

1. Leprosy, Syphilis and other skin diseases are very common amongst the poor class of Mahomedans residing in Bengal and Southern India and living mostly on high beef being cheap.

2. Leprosy, and Tuberculosis are less common amongst the Mahomedans who reside in Cashmere and Hymalayan regions and subsist mostly on meat diet.

Cold climate has an influence to counteract the evil effects of meat.

3. Native Santhal Christians living on beef are generally syphilitic and leprous.

4. Europeans generally feel better without beef during summer.

5. Lepers are better when at rest (physical and mental) with nourishing vegetable diet, but no sooner they are put to fish and meat diet especially beef, all their symptoms seem to aggravate with notorious rapidity.

6. Leprosy is rare, except a few hereditary cases, amongst Hindu widows who subsist mainly on low vegetable diet.

The writer takes the liberty of quoting the opinions of the sages of yore from Hindu Scriptures, regarding beef *as a common article of diet* and its evil consequences in a hot climate like India.

1. Etymological meaning of the term “মাংস”

মাংস ভক্ষয়িতামুত্র মস্য মাংসমিহাস্মাহম্

এতন্মাংসস্য মাংসত্বং প্রবদন্তি মনীষিণঃ ॥

মধুসংহিতা, ৫ অধ্যায়, ৫৫ শ্লোক ।

He (animal) whose flesh I eat in this world, shall eat my flesh in the next. The wise say that this is the etymological meaning of the term “মাংস”—

(MANUSANGHETA. CHAPTER V. VERSE

2. Merit of avoiding meat diet.

বর্ষে বর্ষেহংমেধেন ধো যপেত শতং সমা

মাংসানি চ নখাদয়েদ্ স্তয়োপুণ্যফলং সমং ॥

মহুসংহিতা, ৫ অধ্যায়, ৫৩ শ্লোক ।

The Merit of one who abstains from eating meat is equal to what a person acquires by performing a horse sacrifice each year for a period of a century at a stretch.—

MANUSANGHETA. CHAPTER V. VERSE 53.

3. Beef as the cause of dysentery.

পৃথগ্বেণ দীর্ঘশত্ৰেণ যজতা শস্ত্রনামলাভাদ্গবামালভুশ্চ প্রবীৰ্ত্তিতঃ ।

তেবাক্ষৌপযোগাদুপাকৃতানাং গবাং গোববাদৌষ্যং অসম্বাদৃশস্তোপযোগাং
স্বাদপযোগ্যোপহতাগ্নিনামুপহত মলসাং চতিসাবঃ পূৰ্ব্বেমুপন্নস্তং
পৃথগ্বেণ ॥

চরক অষ্টাদশ অধ্যায়, অতিসার চিকিৎসা ।

Once on a time king Prethadruma instituted a great sacrifice ; at last the number of sacrificial animals fell short, so he caused a cow to be emulated and its flesh to be cast in the fire of the offering. The Brahmans (priests) ate this consecrated beef ; whereupon it (beef) owing to its heaviness (indigestibility) and heat producing properties and as it was an unaccustomed and incommendable diet and followed by a sweet digestionary transformation, affected their digestive fire (capacity), and produced dysentery.—

(CHARAK, 18TH CHAPTER DYSENTERY NUMBER.)

4. Etiology of Kushtam (leprosy) and its relation to beef.

(a) ত্রিংশৎ দ্বিধা প্রোক্তা বাহ্যভ্যন্তরভেদতঃ

বহির্মলকদাস্তগ্ভিদ্ জন্মভেদাচ্চতুর্বিধাঃ

* * * *

কুষ্ঠৈকহেতবাস্তর্জাঃ শ্লেষজা বাহ্যসম্ভবাঃ ॥

গরুড় পুরাণ, উত্তরাখণ্ড, ১৬৯ অধ্যায়, ১—৪ শ্লোক ।

There are two kinds of parasites, viz, internal and external. They may be further subdivided into four groups according as they have their origin in external excreta, in glandular secretions, in blood or in the faeces.

The internal parasites are the sole cause of cutaneous affections such as leprosy, etc.,

(GARUDA PURANUM, UTTARAKHANDA, CHAPTER 169

VERSES 1 --4.)

(b) তস্য পিণ্ড শ্লেষানৌ প্রকুপিতৌ পরিগৃহ্যানিলঃ প্রবৃদ্ধস্তির্ষ্যগ্গাঃ

শিরাঃ সম্প্রতিপদ্য সমুদ্ভূয়ঃ বাহ্যং মার্গং প্রতিসমস্তাদধিক্ষিপতি ।

যত্র যত্র চ দোষো বিক্ষিপ্তো নিঃসরতি তত্রৈব মণ্ডলানি প্রাদুর্ভবন্তি ।

সুশ্রুত সংহিতা, নিদানসূত্র স্থানম, ১৫ অধ্যায় ১শ্লোক ।

The aggravated 'vaya' (nerve force) of a person taking hold of the 'pittam' (metabolism) and 'kapham' (secretory and excretory processes) enraged through the causes such as eating of beef, etc., disperses them in the lateral vessels of the body, which in their turn are thus thrown up to the surface. The places through which these morbidic

principles find their outlet are marked by patches on the skin.

(SUSHRUTA SAMHITA, NIDANA STHANAM, CHAPTER XV, LINE I.)

(c) * * * গ্রাম্যানুপৌদক মাংসানি বা

পরিসাভীক্ষ্মমগ্নতঃ * * *

সুশ্রুত সংহিতা, সূত্রস্থানম্। ১৫ অধ্যায় ১শ্লোক।

Daily and constant eating of flesh of village animals (such as cow, etc.) has been laid down by Sushruta as one of the causes of cutaneous affections such as leprosy etc.

(SUSHRUTA SAMHITA, NIDANA STHANAM, CHAPTER XV, LINE I.)

N.B. Village animals Cow, horse, mule, ass, camel, etc.

(d) হ বা গোঃ মাতা

গাং মা হিংসা

মাতরং মা হিংসা

মাতরং ন খাদেত

হ বা গুহ্মং বা লভেত

অমীবাং কুষ্ঠং বা লভেত ।

ঐতেরীয় ব্রাহ্মণ ।

O I say ! cow is the mother ; do not kill the mother (cow) ; do not eat her flesh, as otherwise you shall get phthisis (literally withering disease) as otherwise you shall get leprosy.

(OYTARIA BRAMHANA, RIG. VEDA.)

Abuse of Meat.

Excessive use of meat increases the wear and tear of the heart muscle, causes acidosis, acid intoxication and indicanuria. We know that vegetable albumin is more easily assimilated, besides there is less tendency toward auto-intoxication. Prof: Metchnikoff has more than shaken its position as the principal article of diet for man.

It should be remembered that

- (i) Meat is a good germ medium
- (ii) It putrefies easily especially in a warm climate, in the intestinal canal
- (iii) It remains 4 hours in the stomach for digestion
- (iv) It contains xanthin groups &c.

The retention of the products of nitrogenous waste in the system, especially uric acid, is a factor in the production of high arterial tension, arterio-sclerosis and other signs of premature decay.

Does meat eating encourage crime? is the latest crankism to make a storm in the inkpot. According to the fruitarians there is burglary in beef, murder in mutton, violence in veal and parricide in pork.

Daniel "in the test before the king, proved that man could flourish and nourish better without meat than with it."

The Purin-Free Diet.

What do we mean by a purin free diet? The term purin was given by E. Fischer to the nucleus C_4N_5 and all substances containing this nucleus are termed purin bodies.

Those of ordinary occurrence are Hypoxanthin, Xanthin, Uric Acid, Guanin, Adenin, Caffein and Theobromin. These substances exist in meat and are principally waste products on the way to excretion in the body of the animal furnishing the food. They consequently have no food value but must undergo chemical change and be, in turn, excreted as uric acid and urea. So that a purin free diet would exclude all meats, fish, fowl, meat soups, meat broths, beef tea, bouillon, kidney, liver, pancreas, bacon, peas, beans, asparagus tips, mushrooms, oatmeal, or anything made from the entire grain, tea, coffee, cocoa, chocolate, and the malted liquors, ale, beer, porter, and stout.

Purin Metabolism.

The exact nature of the chemical processes by which the body metabolism is carried on has not been determined, but the evidence points towards a separate and distinct *enzyme* which has as its special duty the changing of the nucleo-proteids into purin bodies and the splitting up of the purin bodies into their end products. For example:—

- (1) Nuclease acts upon the nucleo-proteids, converting them into hypoxanthin, xanthin, adenin, and guanin.
- (2) Oxidase converting hypoxanthin into xanthin, and xanthin into uric acid and urea.
- (3) Adenase converting adenin into hypoxanthin and guanin ;
- (4) Guanase converting guanin into xanthin and uric acid and urea.

Advantage of Purin diet.

Purin bodies are stimulants but have no food value.

Advantages of Purin-free diet.

Patient gain in weight and strength and are able to do more and better work with much less fatigue.

Nuts are a very good substitute for meat, containing from five per cent to ten per cent more protein than meats, and no purin bodies. They are very easily digested if thoroughly masticated, and if eaten as a substitute for meat will, with very few exceptions, cause no digestive disturbances. In fact, the reason why nuts are believed to be indigestible, or are indigestible for some people, is because they do not chew them thoroughly, and take them after eating meat, thus loading the system up with too great a proportion of nitrogenous food material.

Diseases caused by Purin Metabolism.

Nervous debility, fatigue neuroses, neurasthenia, hysteria, occupation neuroses, insomnia, acute insanities, etc.

N. B.- The object of treatment is to conserve what nerve power still remains to the patient and bring it back to the normal mark, and this end is best attained by a liberal anti-purin diet.

Purin Diet.

meats, fish, fowl, meat soups, meat broths, beef tea, bouillon, kidney, liver, pancreas, bacon, peas, beans, asparagus tips, mushrooms, oatmeal, or anything made from the entire grain, tea, coffee, cocoa, chocolate, and the malted liquors, ale, beer, porter, and stout.

Diet List of Purin Free bodies.

<i>Cereals.</i>	<i>Vegetables.</i>	<i>Fruits.</i>	<i>Nuts.</i>	<i>Miscellaneous.</i>
Cream of wheat	Cauliflower	Oranges	Hazelnuts	Milk
Puffed rice	Cabbage	Grape fruit	Chestnuts	Eggs
Wheat flour	Lettuce	Bananas	Almonds	Cheese
Wheat bread	Spinach	Peaches	Walnuts	Butter
Indian corn	Potatoes	Prunes	Butter nuts	Olives
Macaroni	Sweet potatoes	Pears		Olive oil
Rice	Sweet corn	Dates		Gelatine
Tapioca	Egg plant	Figs		
	Parsnips	Apples		
	Turnips			
	Carrots			
	Beets			
	Onions			

FATE OF CARBOHYDRATE IN THE BODY.

The Carbohydrate of the food is absorbed chiefly as glucose (grape sugar), conveyed into the liver as glucose, converted into glycogen there and stored up in the liver as glycogen: Some of the glycogen is again converted into glucose by a special ferment—liver diastase—and carried to peripheral circulation for combustion.

Claud Bernard regards liver as a sugar forming organ: Pavy regards liver as a sugar destroying organ.

The sugar on entering the tissues serves various purposes :-

- (1) It undergoes combustion
- (2) It may be stored up as glycogen.
- (3) „ „ „ fat.
- (4) It may be partly unconsumed and leave the body by the urine.

1. Immediate combustion of sugar.

Sugar serves principally for the immediate supply of the needs of the body.

That a combustion begins soon after absorption may be determined in a striking manner by a study of the respiration.

The grape sugar is first oxidised into glycuronic acid and then becomes further oxidised.

The custom of the Hindus to drink a glass of *sarbat* (sugar in water) after manual labour *e.g.* a long wearied journey, burning the dead &c, seems to the writer highly scientific.

2. Deposition as glycogen.

If the absorption of sugar over steps the immediate requirement, the quantity of sugar in the blood and tissues does not perceptibly increase, the temporary surplus being stored up as reserve material in the form of glycogen, chiefly in the liver and in the muscle.

3. Transformation into fat.

The storehouse for glycogen being filled to a certain standard, the additional carbohydrate will be changed into fat and stored up as "carbohydrate fat", if the continued absorption exceeds the using up.

Carbohydrate then is, next to fat, the most powerful fat producer.

N. B.—In diabetes Von Noorden readily accepts the possibility of a constant change of the sugar into fat, and believes that certain diabetics possess the capacity of burning off their sugar by first transforming it into fat.

4. Excretion of sugar in the urine.

When large quantities of carbohydrate are ingested, a proportion is neither utilized nor burnt off, and so appears in the urine. It is commonly called "alimentary sugar excretion". Alimentary glycosuria occurs in a healthy person only by saturating the organism with soluble carbohydrate.

Sugar Indulgence.

The student of physiological chemistry knows it well that free sugar—sugar as chemical extract—is a foe to

digestion and assimilation ; for owing to its swift oxygenation, sugar introduces processes of tissue break-down at a rate more rigid than is possible for systemic assimilation to replenish and reconstruct.

The premature break-down of teeth that makes dentistry one of the most lucrative professions in the world, is directly due to excess of free sweets in the system. But the menace of decaying teeth is insignificant compared with the menace of decaying stomach, decaying liver and decaying kidneys—due to the same indulgence. Protracted indulgence in sugar, coupled with rich pastry, have been declared by prominent pathologists to constitute the primary factor in the evolution of tuberculosis diabetes and cancer.

The peril of sugar indulgence lies in its rapid oxygenation. Like the combustion of paper or cotton in a furnace, through which is quickly used up all the available oxygen at the expense of the less igneous because of heavier fuel, say wood or coal—the action of free sugar, in the processes of assimilation, *robs the system of its available supply of oxygen*, which brings about the decomposition of the circulating proteins and the inevitable evolutions of carbonic acid gas, alcohol and ammonia, which again means asphyxiation and cellular intoxication.

Fate of Fat in the body

After emulsion and saponification fat is not absorbed as fat globules through the intestinal epithelial cells : fat molecule is broken up in the intestine by the action of steapsin of pancreatic juice into fatty acid and glycerine.

The cells take them in and combine by process of synthesis into minute fat globules; they pass through lacteals to thoracic duct which opens into left sub-clavian vein; thence to the circulation.

The Digestion and Assimilation of fats.

After getting an entrance into the blood-stream with the chyle, the neutral fats remain in the circulation for the short period which elapses before they are selected by the tissue cells for combustion or storage in the subcutaneous tissues, the para-peritoneal spaces, and the liver. Different ferments have been found to exist in the blood—some in the serum, which split the fat (Hauriot), and others in the red corpuscles, which convert it into the form soluble in water (Comustein, Michaelis and Weigert.)

It is admitted that this lipase serves for the passage of the fats from the capillaries into the tissues

The fats ought to be able to pass through the capillary wall when split up only, or in a form soluble in water, just as Pflüger considers that they pass through the intestinal wall.

They are used up in the metabolism of the tissues and thus help to preserve the heat of the body; the unused fat globules are stored up as adipose tissue to prevent undue waste of heat of the body.

During the periods of fasting and in wasting diseases. *e.g.* phthisis etc., the fat streams from the dépôts back again into the blood, in order to supply the organs requiring fat. Here again a previous splitting of the neutral fat is necessary

for its passage out of the fat cells into the lymph stream. The storing up of fat in the liver only occurs if the glycogen has disappeared therefrom.

Fat Metabolism.

There are two kinds of fat:—

I. Vegetable fat *e.g.* olive oil etc.

II. Animal fat *e.g.* butter, beef fat and lard.

Students of physiology know it well that

1. Fats remain quite long in the stomach.
2. Fats in the first hour of digestion pass very slowly and irregularly into the duodenum.
3. Fats pass with increasing rapidity after this time.

N.B. Beef fat remains a much less time in the stomach than the other two. Dr. Jesse S. Myer (*Interstate Medical Journal* September, 1909).

4. Fats are not absorbed in the stomach. The absorption begins in the jejunum, and is practically ended at the caecum.
5. Neutral fat cannot be absorbed except after splitting into fatty acid or its compounds.
6. The chemical change in the stomach is very slight in the first hours, when the acidity is high.
7. When secretion ceases which occurs a little later, the fat splitting is considerable.

Prof. Vollhard and his pupils remark that there is a fat splitting ferment manufactured by the stomach.

Prof. Levites believes that the fat digestion which takes place here is due to regurgitation of ferments from the small intestine.

Prof. Umber makes the following statements: When the fat in the stool is as much as 45 per cent. of that ingested it speaks for simple shutting off of the bile. When more than 60 per cent. is found there is also interference with the pancreatic function. If more than 50 per cent. of fat escapes from a non-icteric patient there is probably pancreatic disturbance. When neither bile nor pancreatic juice reaches the intestine, as much as 87 per cent of fat is lost. There must be other fat *splitting enzymes* besides the one in the *pancreatic juice*. Although the fat absorption, which depends on the pancreas may be strongly altered, the fat splitting is not greatly affected until many parts of the digestive canal are diseased.

Bile salts greatly increase the absorption of fats from a mixture that contains free fatty acids or soap.

Experiment.

Neutral oil can be absorbed without action of either bile or pancreatic juice from a loop of intestine, where both these secretions are excluded. Under such conditions the neutral oil becomes markedly acid in reaction. (*Dr. Jesse S. Myer Interstate Medical Journal September 1909.*)

Fat splitting enzymes.

I. Prof. Muller describes them as Hemoconien or "blood dust" composed of fat and of varied size.

1. These bodies are not present in the blood of individuals on a fat free diet.

2. Their time of appearance and number depend largely upon the ingestion of fat. Ieva has verified these statements and added a few observations of his own.
3. The larger the amount of fat ingested the sooner do the hemoconien appear.
4. The larger their number, the greater the number of large forms.
5. The hemoconien make their appearance about one hour after a full meal.
6. They finally disappear after 15 or 16 hours.
7. Their appearance in the blood is delayed in cases of poor stomach motility or pyloric stenosis.

II. Prof. Strauss calls them lipolytic substances in the blood serum.

III. Prof. Bergel claims to have found a fat splitting ferment in the lymphocytes.

Derivatives of fat.

The acetone Bodies.

The entire or almost entire deficiency of carbohydrate in the metabolism causes *acetonuria*.

After a short duration of acetonuria there occurs an excretion of acetic acid and oxybutyric acid.

An increase of albumin in the food greatly diminishes the acetonuria probably because when the decomposition of albumin is increased a considerably larger amount of carbohydrate is derived from it.

Muscular work does not influence existing acetonuria.

The administration of carbohydrates removes acetonuria within a few days.

Source of acetone bodies.

Von. Jaksch traces the acetone bodies back to albumin.

Carl. Von. Noorden remarks that they are derived from the splitting up of the tissue albumin.

Geelmuyden and Rumpf point out the fatty acids --above all, butyric acid --as the probable source of derivation of the acetone bodies,

Magnus Levy decides by the method of exclusion, that after all, the acetone bodies are derived from fat.

In short butyric acid, its salts and butter cause an increase of acetone bodies.

The origin of the acetone bodies does not take place in the intestine. It takes place in the liver, muscles and other organs of the body.

The acetone bodies are intermediate products of normal metabolism.

The urine and expired air of healthy men contain traces of acetone. When the oxydising power of the body is lost as in diabetes, these bodies make their appearance.

In conclusion (1) the absence of proper carbohydrate metabolism, and (2) the presence of fatty acids, especially the lower ones (oxybutyric acid) are the essential factors in causing acetonuria.

The Physiological Activity of Many Products of Regressive Metamorphosis and Their Role in Pathology.

Dr. F. M. Lifschitz remarks of the influences of under-mentioned products on the blood pressure.

- (1) *Alloxan* increases the blood pressure, slows the pulse and increases its amplitude. This appears to take place through the action of the substance on the vasomotors, as well as on the centre for the vagus nerve.
- (2) *Paraban acid* also increases the blood pressure and the amplitude of the pulse. This substance appears to act on the muscles of the heart, on the vasomotor centres of the medulla oblongata, and the centre for the vagus.
- (3) *Guanidid and ammonium carbamate* increase the blood pressure by their action on the vasomotor centres and the blood vessels.
- (4) *Indol, skatol, phenylacetate, phenyllpropionic acid* have only a slight and passing influence on the blood pressure.
- (5) *Acetone bodies* have a lowering effect on the blood pressure, slightly accelerate the pulse, and increase its amplitude, depending on the depressing influence of these substances on the vasomotor centre in the medulla oblongata and the centre for the vagus.
- (6) *Oxybutyric acid* (neutralized by soda, and given by the mouth) causes increase of blood pressure, slowing of the pulse, and sometimes increase of its amplitude.

- (7) *Lecithin* causes increase of blood pressure, principally in animals that had been rendered anæmic by loss of blood (venesection). *Lecithin* is apparently useful in the animal organism, especially where it has become weakened by illness. The split products of *lecithin*, glyccero-phosphoric acid and trymethalmine exert a marked influence in raising blood pressure.

VARIETIES OF FOOD STUFF.

Raw-Meat Juice: It is squeezed juice of fresh minced meat, and consists of serum, albumin and muscleplasma with a large number of red blood-cells. It is very easily assimilable and strengthening and is largely used for invalid cases especially for rapid tissue regeneration. It is a most favourable diet for malassimilation in children, tuberculosis, dyspepsia and diabetes. The most valuable and useful property which it has got is to help the assimilation of other foods in a rather inexplicable way. In other words a small quantity achieves a great end something like enzyme action probably on account of its containing some internal secretion from the ductless glands which healthily influences metabolism: besides it has antiscorbutic property.

Soups: Soups are meat extracts prepared by boiling. The boiling should be slow and long continued and at low heat. Light broth has water added but jug soups are extracted without water. The advantages of the latter are their small bulk and concentrated essence.

Soups have very little nourishment in them as all the soluble albumin are coagulated by heat and left behind keep-

ing the extractives which act as stimulants. An increase in weight is not so often seen to take place by taking soups as by taking raw meat juice or bone marrow. But in wasting, its gelatin saves tissue-waste, gives strength and energy to heart and digestion, and indirectly helps nourishment.

A. B. Soups irritate the kidney and are therefore bad for people suffering from kidney trouble.

It is an excellent mineraliser of the system. The extract of meat at a high temperature or by long boiling brings a large amount of gelatin which is thick jelly-like substance solidifying when cold. As has already been said in itself it is not of much nutritive value but is like the waste materials a highly powerful stimulant. They are generally prepared from tendon bone etc.

Testes—It is a valuable nervine tonic and aphrodisiac. It may be taken cooked or uncooked. "Uncooked" is the best form if taken fresh, either minced or sliced and kept between two thin slices of bread like sandwich sweetened and scented. 'Lightly fried' is the best cooked preparation. By boiling it loses its efficacy.

Brain. It should be taken cooked, either boiled into thick soup, or boiled and sliced and taken between slices of bread like sandwich or boiled slices may be fried with egg like cutlet.

It contains a large amount of fat and is difficult to digest. It is a nervine tonic of very high value and an aphrodisiac containing 'cerebrin' and valuable glycerophosphates. The brain of fishes are more valuable, being more easily digested but it is more difficult to procure in sufficient quantity.

Liver—It contains a large amount of sugar (glycogen) and is fattening. It is always taken cooked.

Fat—It is fattening and is very difficult to digest. It is generally used in cooking but seldom taken alone.

Egg—It is the cheapest, the most convenient nitrogenous food and the most widely used. It is highly nourishing, and when taken half boiled, is very very easily digestible. The yolk is richer in fat. Taken raw it is less easily retained in the system, as being different in nature from the serum-albumin it tends to pass out with the urine. But it is very convenient and strengthening when taken as egg-flip. Hard boiled egg is most difficult to digest. Poached egg in a little butter is very palatable and is quickly prepared and simple.

It may be beaten up frothy and fried and when thus prepared becomes spongy and soft, and thus easily admit the digestive juice but is liable to cause acidity. Not being cellular, the white portion does not give rise to uric acid, as meat does and is thus the only form of proteid which can be given to people with uric acid diathesis.

Milk and milk preparations *viz.*, cheese, dai, etc., are excellent purin free diet.

VARIOUS INGREDIENTS PRESENT IN FOOD STUFFS.

1. **Iron.** The system requires about 10 centigrams of iron daily to compensate for the normal elimination; the average amount of solid food consumed in a day is 1,000

grams and that, speaking broadly, this mass contains about 1,10,000 of iron. Vegetable substances having a marked colour are commonly regarded as fairly rich in iron and spinach is said to be especially so. Lean meat contains from 1/3 to 1 part of iron per 1,000. Hence, 100 to 300 grams a day contains the ration of iron, along with an adequate and not excessive amount of proteid.

2. **Iodine.** It is present in certain fishes and thyroid gland.

3. **Nuclein.** It is present in the thymus, spleen, liver and kidney. It is contraindicated in lithæmic and gouty conditions. It is of great value in combating tuberculosis.

4. **Antiscorbutic element.** It is present in fresh fruits, (lemon, orange etc.), vegetables, fresh milk and raw meat juice.

5. **Gelatin.** It is a fuel-food. It is indicated as a styptic in many forms of dribbling internal hæmorrhage, in purpura and even in hæmophilia. Care should be taken to get a genuine animal gelatin, and to cook for half to one hour as a precaution against tetanus, especially if there is a suspicion of any form of solution of continuity of the alimentary mucous membrane; then flavour it with orange or lemon juices.

6. **Lecithin.** It is most conveniently dispensed as egg yolk. Brains may also be served as a conveyor of lecithin.

7. **Calcium salt.** It is present in milk and in some spring water. In Bengal water is soft; hence calcium metabolism is deficient. To supply this want the Hindu is in the

habit of chewing betel with slaked lime, catachu, nut and other spices.

8. **Salines.** They are present in vegetable in the shape of potassium and sodium. 15 grams of sodium chloride are necessary to maintain the strength of the physiologic solution.

9. **The minimum of carbohydrate.** Sugar aids in the solution of lime. Hence, there is good reason to regard a reasonable amount as beneficial for rickety infants and children. Quite aside from the nutritive value of carbohydrates, about 80 grams daily are necessary to prevent the development of acidosis.

10. **The reduction of nitrogenous foods** is recommended in gout, lithemia, nephritis, hepatic sclerosis, angio-sclerosis, intestinal putrefaction (marked by an excess of urinary indican) and high urinary acidity not due to acetone bodies.

11. **The reduction of fats** is indicated in obesity, pancreatic indigestion and fatty acid intoxication.

FATE OF COMMON SALT.

Common salt (NaCl) is one of the essential ingredients of our body. It is like alcohol a faithful friend when properly used but a potent foe when abused.

We use it as a common article of diet taxing our system daily with it till sodium chloride exceeds its physiological limits; hence tissue becomes "Vulnerable" *i.e.* susceptible to infection.

Use it according to the demands of Nature very cautiously bearing in mind it will become a bad master instead of a

humble servant if abused. Thus during need it will impart a helping hand against various diseases. The writer uses it very moderately for the last 8 years with wonderful success.

Its Physiologic uses.

- (a) It keeps the albumin of the blood and of the lymph in a soluble condition (Lehmann).
- (b) It prevents the too-watery state of the brain and the nerves.
- (c) It regulates and intensifies the flow of all the various fluids on which the life of the organism depends (Voit).
- (d) It is essential for the action of the liver, and forms a necessary constituent of the bile (Liebig).
- (e) It is the medium for the elimination of effete, used-up, and hence poisonous organic substances out of the body, and is thus the best and most natural purifier of the blood (Liebig); in short: -

It is a never-failing component part of the animal economy; it is absolutely necessary for the growth and the continued existence of the human body; there is no other substance in the whole universe which can replace it, and to abstain from it absolutely leads to certain disease and death.

Evolutionary biological researches have forced upon us the conclusion, that man had his origin in the sea; that the thread of human life commenced in salt water; that, as *Professor Ranke expresses it*: "*In the blood we still carry the sea in our body*"; and, most important of all, the embryonic development of every human being takes place in salt water

(the Amnion water,) which contains about one per cent. of mineral ingredients, chiefly NaCl.

Its Therapeutic Uses.

1. NaCl is an instrument in imparting immunity to the human body against epidemic Zymotic diseases *i.e.* plague, cholera, malaria etc.

A medical critic once sneered in his review of *Common Salt* at "The idea of recommending common salt as a medicine—*salt that we eat.*" One may wonder how this worthy son of *Æsculapins* estimates the use of air, in the open-air treatment for curing consumption: "*air that we breathe.*"

Hence the necessity of common salt as a preventive against such diseases.

2. Cholera (vide the article on cholera in my *Treatise on Treatment.*)

3. Collapse from hæmorrhage, surgical shock.

4. Sea-water injection in rickets, tuberculosis, malnutrition and other complaints

Sea-water contains about 3·3 per cent. of mineral salts, and on diluting 2 parts of sea-water with 5 parts of fresh water a solution is got isotonic with blood-plasma, and almost identical to it in mineral content. In this solution leucocytes retain their activity, and it is claimed that the salts are present in the proper proportion for building up the tissues and cells of the body. Injected into the deep subcutaneous tissue, this diluted sea water is stated to possess very remarkable tonic properties, which enables it to

increase the power of the body to resist infection, though the solution is devoid of bactericidal action. For therapeutic purposes the sea-water should be obtained about twenty miles from land, and at a sufficient depth, say 36 feet, to avoid surface contamination. After mixing with plain water it is sterilized by passing through a porcelain filter. Boiling destroys the peculiar value of the solution, and the solution should not be more than three weeks old.

The main effects of undue salt-eating are :-

1. A thickening and partial paralysis of the vocal cords and an almost continual sore throat.
2. A pale and waxy colour, with dryness of the cuticle, which yet perspires too freely upon exertion.
3. Constipation or chronic diarrhoea.
4. Abnormal appetite ?
5. Plethora and corpulence.
6. Retarded endosmosis and exosmosis.
7. Thinning of the blood, slow circulation and lowered temperature.
8. Dandruff, cutaneous affections, deposits and abscesses (*Medical Argus*, September 1896).
9. Opacity of the lens hence cataract. Supersalinity of the blood is an accelerator of senility and a cause of cataract,

KUNDE'S DISCOVERY.

If you take a frog and give it a .2-.4 dose of salt either under the skin or in the rectum, you will, in a short time,

observe a bulging out of the cornea with an increase of the aqueous humour, and sooner or later, *an opacity of the lens*.

Therapeutic value of Salt-poor Diet : -

1. Pareuchymatous nephritis.

2. Circulatory diseases *e.g.* venous thrombosis, arterio-sclerosis. A salt-poor diet relieves peripheral resistance in heart affections, increasing the amount of urine, and thus relieving stasis.

3. Various skin affections *e. g.* eczema, &c.

4. Inflammations of serous membranes *viz :*

(a) Pleurisy.

(b) Synovitis.

(c) Gonorrheal epididymitis.

(d) Ascites with cirrhosis of liver

(e) Tubercular ascites.

Dr. Alvens at the university medical clinic at Tübingen states that ascites had entirely vanished by the end of five or seven weeks under a Salt-poor diet.

The food consisted of oatmeal, rice, cooked fruits, eggs, milk and unsalted butter, the total intake of salt being from 2 to 3 gm. a day instead of the usual ration of 13 gm. on the ordinary mixed diet. An occasional day of mixed diet was interposed to keep up the patients' appetite. On the salt-poor diet the amount of salt eliminated markedly surpassed the intake. It seems to be evident that the blood in seeking to maintain its osmotic balance during the salt-poor period takes up salt out of the tissues and preeminently out of the

ascitic fluid. As the salt is taken up into the blood, it is accompanied by water to keep it in solution, and this excess of water in the blood is rapidly worked off through the kidneys. — *Therapie der Gegenwart*, March, 1910

N. B. — An excess of salt increases the accumulation of fluid which compresses the lymphatics and capillaries, and thus prolongs the course of the inflammation.

5. Obesity.

6. Epilepsy.

Richet and Toulouse announced, at a recent meeting of the Paris Academy of Sciences (November 20th, 1899), that their experience with 30 female epileptics has demonstrated the fact that depriving the nervous system of the usual amount of salt in the food renders the nervous tissue more susceptible to the absorption of medicinal salts which it takes up to a remarkable extent, thus rendering an extremely small dose effective. Thus 2 grams of sodium bromide a day, administered under the conditions referred to, arrested the epileptic attacks, sometimes in less than a week, no matter how frequent they had been before. Several patients had shown no recurrence for six months since treatment. Richet proposes to call this the metatrophic method. The saltless food has no bad effect on the patient.

Amount of Salt in ordinary article of diet :

Dr. Strauss (*Zetschar F. Phys. U. diet Therap.* 1908, XX, 11), remarks: — Milk contains 0.15 to 0.18% of salt, salted butter 1%, unsalted butter 0.02%, cheese usually 1.5 to 2.5%, eggs 0.14, the white of egg 0.19%, egg yolk 0.02%.

meat 0.1°_{\circ} . Corn and legumes (except lentils, 0.23°_{\circ}) contain 0.01 to 0.1°_{\circ} . Most other vegetables contain about 0.1 . Spinach (0.21°_{\circ}) and celery (0.31°_{\circ}) contain more than the average. Fruit usually contains less than 0.06°_{\circ} . The following partial list shows the importance of methods of cooking. Thus, poached egg contains 0.5°_{\circ} sodium chloride; scrambled and omelets contain 2.4 to 2.7°_{\circ} . Roast beef contains 1.9°_{\circ} to 2.8°_{\circ} and beef stew 3°_{\circ} . White bread contains 0.48°_{\circ} to 0.7°_{\circ} while brown bread 0.75 .

FATE OF WATER.

Water is an important constituent of our body.

An adult introduces into the body daily about 2 litres of water in the form of various drinks and under ordinary circumstances about 1,500 cubic centimetres are daily eliminated by the kidneys, 800 to 1,000 cubic centimetres by the skin and lungs and 100 cubic centimetres by the intestines.

Man is the proper physician of his own self to limit the physiological bounds. We take in and give out according to the demands of nature.

In health an equilibrium is established between the amount absorbed and the amount eliminated. If the amount falls below a certain minimum a sensation of thirst is experienced, and if the amount were still further reduced there would be a disturbance of the circulation and respiration. On the other hand excessive absorption of water into the blood and tissues is harmful. In these circumstances the blood and tissues become impoverished of saline matters, and in some cases a tendency to dropsical effusions has been

observed. According to Hutchison and others water is not absorbed by the mucous membrane of the stomach, and when swallowed begins to flow out at once in gushes—more quickly if hot : it starts gastric movements and “unlocks the pylorus.” Thus a large quantity of water taken during digestion interferes with it, distends the stomach, dilutes the gastric juices, and hastens the food out of the stomach. Most water is absorbed in the small intestine by the capillaries of the villi and absorption is most active at the lower end of the ilium and is continuous through the large intestines. Elimination of water takes place by the kidneys, skin, lungs and intestines. Water, therefore, acts as a diuretic and diaphoretic and augments the functional activity of the excretory channels. Increased elimination leads to increased absorption, metabolism is stimulated leading to increased depreciation of nitrogenous tissue and increased elimination of urea and other salts. In passing through the system water assists the circulation of nutrient fluids, helps chemical changes, promotes absorption, secretion and excretion, and by evaporation through the skin assists in maintaining the body's uniform temperature.

Its Physiological Use.

It is 1. a solvent of salts.

2. a diluent of food stuff.

3. an agent of osmosis upon which, under the controlling influence of physiologic selection, all nutritive interchange depends.

4. a medium of circulation.

5. a stimulator of metabolism.

In the metabolism of red blood cells it plays a direct part. Increase of the water content of the blood influences the evolution of new cells, especially after hemorrhagic impairment. The rate of evolution is distinctly hastened by the persistent introduction of normal saline solutions by hypodermoclysis, by intravenous injection or by gastrointestinal absorption.

6. an eliminator of products of metabolism

Its Pathological use.

When *innocent* water exceeds its physiological limits it exercises a *destructive influence* upon the living tissues of our organism, *i.e.*

1. On the blood.

When the physiologist wishes to *kill* the blood *-i.e.* to dissolve the blood-cells (with the view of obtaining blood-crystals), he simply adds some pure water to the blood: the cells swell up and assume a spherical shape (designated by Professor Klebs as the *death-form*), then these spherical cells burst; the red colouring matter (the hæmo-globin) diffuses in the serum; the blood assumes a dark violet colour, and becomes more liquid (less viscid). This red-stained serum permeates the tissues and appears in the urine. If such a destruction takes place more or less extensive, then disease in one form or another - if not death - is the result.

2. On the muscular tissues.

On cholera, Professor Max Von Pettenkofer points out that those, most liable to the disease, are distinguished by an increased amount of water in their muscular tissues.

3. On the nervous tissues.

- (a) Professor Ranke informs us that "*tetanus is always connected with a considerable proportional loss of solid matter in the muscular tissue, which is the result of an augmentation of water.*"
- (b) Professor Buhl remarks that *meningitis* is always accompanied by the presence of an abnormal quantity of water in the nervous matter.

A remarkable instance of the deleterious effect of plain water on nervous sensibility is the following, which every one can experience for himself: "Weber has proved, by experiment, that, when the tongue has been immersed for one half to one minute in plain water of a temperature a little over blood-heat, it has lost its capacity of tasting sugar.

Its Therapeutic use.

1. A glass and a half of *cold* water taken on an empty stomach stimulates stomach, liver and gastro-intestinal tract and thus helps to regulate the stools and eliminate the toxins, hence it is useful in :

- (a) Biliousness.
- (b) Chronic atonic constipation.
- (c) Obesity.

2. *Warm* water acts more quickly than cold water on the skin and kidneys.

3. Tepid water will assist vomiting.

4. The sipping of water acts as a mild stimulant during the act of swallowing, and it is said a person may by such continual sipping, have all the effects of alcoholic stimulation.

Sir Lauder Brunton remarks :—

“Sipping cold water not only allays the thirst of fever better than anything else, but acts as a stimulant to both heart and liver.”

5. The *temperature* of the water drunk with meals is of importance. If taken *hot* with a substantial meal it is liable to distend and enfeeble the stomach, whilst if *iced* it does harm by contracting the capillaries, diminishing the normal blood supply, and therefore the secretion and absorption.

CALCIUM METABOLISM.

Calcium salts are indispensable for the maintenance of life and most efficacious in sustaining function of cardiac and skeletal muscles; calcium glycono-phosphate is so to speak the elixir of life. In a province like Bengal where the water is soft, there is deficiency in lime hence its inhabitants are not well developed physically like those of North Western Provinces: to counteract this, people takes betels with lime and other spices which seems to me physiologically correct. Exercise rapidly increases calcium metabolism.

Calcium salts exist in our system as

i. Free calcium ions.

ii. Fixed lime.

I. The free calcium ions increase the tone and contraction of the arteries and arterioles, heighten the blood

pressure, and maintain the force and efficiency of the cardiac contractions.

11. The fixed lime or that which is linked on to the molecules of albumin increases the viscosity and coagulability of the blood. It is also important to note that the suprarenal and pituitary secretions lead to the retention of lime salts in the blood and tissues, while the thyroid and ovaries increase calcium metabolism, diminish the free and fixed lime in the blood and thus lessen the viscosity.

The Physiological use :

Calcium (i) increases the efficiency of cardiac beat.

(ii) delays dilatation,

"The effects produced by lime salts in dilatation, and even the persistent spasm induced by the alkaline preparations are completely removed by a minute trace of a potassium salt, 1 in 10,000 to 15,000."

Thus there exists an antagonism between the potassium and calcium salts.

(iii) hastens clotting of blood.

Dr. T. Addis (*The quarterly Journal of Medicine*, January, 1909.) concludes :-

"1. The coagulation time of the blood is unaffected by the administration by the mouth of soluble calcium salts or of citric acid."

"2. The amount of ionizable calcium in the blood is increased by the administration of soluble calcium salts by the mouth, and is diminished by the administration of citric acid."

- (iv) Promotes the viscosity of the blood in the capillaries.

The viscosity of the blood in the capillaries increases the work of the heart: this contraction and the action of the heart are due to the free calcium ions.

Diseases in which calcium salts are deficient and therefore demand their administration:

Rickets, hæmorrhagic diathesis, pneumonia, acute stage of typhoid fever, epilepsy, disseminated sclerosis, neurasthenia, hysteria, skin diseases, *e.g.* eczema, urticaria etc., myalgia, cramp of calf muscles, tetany, mucous colitis, cirrhosis of liver, dropsy, chronic Bright's disease, advanced granular kidneys, pseudo angina etc.

Diseases in which calcium salts are in excess and therefore demand their withdrawal:

Free Calcium ions. <i>(in the blood.)</i>	Fixed Calcium. <i>(in the tissue.)</i>
Asthma.	Arterio sclerosis.
Acute Rheumatism.	Bronchitis and Emphysema (later stages).
Migraine.	Gout.
Oxaluria.	Goitre.
	Locomotor Ataxia.

Diseases in which calcium salts are in excess
(both in the blood and in the tissue.)

- i. Spasmodic or true Angina.

- ii. Obstinate constipation (some cases).
- iii. Spasmodic colitis.

Calcium salts present in :

- i. Milk and all milk foods *e.g.* cheese, soured milk etc.
- ii. Animal Jellies.
- iii. Egg shell.
- iv. Hard water.

Various Decalcifying Agents : -

Take up a good deal of free calcium ions and the loosely fixed lime in the blood vessels and other tissues, and hence shall be continued until the tissues are well decalcified.

- 1. Acids *e.g.* phosphoric, citric, etc.
- 2. Acid fruit.
- 3. Acid salts.

Writer's favourite formula : -

R.

Acid phosphoric (Dil) 3. ss

Aq : Aurantii floris ad. 3. iv

Mft. for a dose : Sig : one thrice a day after meal.

KIND OF FOOD.

The answer is that which you like best, which is appetising to you and which your stomach can digest : The writer quite agrees with the Mahomedan proverb "Ja roche tha Khana" *i.e.* eat a thing if you feel a natural desire to take it.

If you are a follower, of Buddhistic doctrine, "বাহিংস।

সর্বভূতেষু" *i.e.* Don't take life of God's creature, if your conscience shudders against bloodshed realising one of the highest doctrines ever preached by the Prophet of Nazareth. "As you wish that man shall do to you, do unto others likewise." if your heart be full of the milk of human kindness, and if you wish to prolong your days in this land of ours especially in the tropics, the writer advises his readers to be on vegetable and milk diet.

One may avoid meat and fish because he has not purse enough to purchase them, the second may shun them because his stomach fails to digest them, but there lies the honour for the third who through sheer dint of moral strength relinquishes the taste of meat and fish for good.

How long to take the meal.

Is it rational to swallow food as quickly as possible or to sit down for hours on the table? A man of business has very little time to spare while a sloth easily slips down hours.

The median course is the best, but for a man of weak digestive apparatus it is better to be on the balance of the latter.

When at Hongkong the writer had the opportunity of visiting Chinese dinner. Among other things they drink soup by sips as the first part of the meal; then they roll on a pair of round sticks by the side of a basin of rice in such a way, that by centrifugal force, rices begin to fall in the mouth not by bulk but by serial numbers. Thus they **have** to masticate rice well before swallowing, hence they **less** suffer from dyspepsia, indigestion etc.

From this the writer has learnt one great scientific truth that the secret of health is thorough mastication.

How much to take.

The rational reply is : -

As you are hungry before meal,
Mind ? come out of table hungry still.

To enjoy meal to one's heart's content leads to indigestion.

It is a pernicious practice amongst the lower class of the Indian and the writer presumes it amongst other nations as well, to eat and drink as much as one can gulp down during festivals. This leads to catarrh with subsequent vomiting and purging.

To request a guest to take something extra by invoking such phrases *e.g.* "For health's sake" "For my sake" etc., is unscientific, because one should stop taking food before the feeling of satiety.

The keynote of health is not overfeeding but on the contrary occasional starvation.

What and How to Eat.

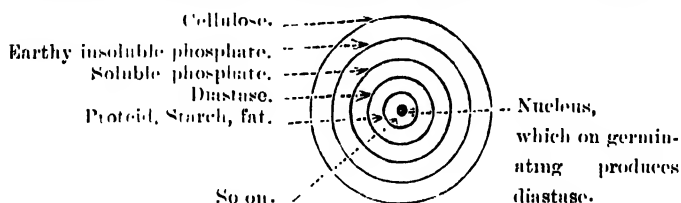
The logical and effective way is to head off such catastrophes, and to keep the body wholesome and active, by cutting down the intake and especially by taking in only those foodstuffs which, even if they are not utilized, are easily eliminated, and do not give rise to poisons in the body. This does not mean that the middle-aged person should put himself on a regime diet, or be continually fussing about what he eats. Life would hardly be worth living upon such terms. In general, any person intelligent enough to read this article,

knows what he should eat and what avoid, without interfering much with his tastes : and upon any special point his family doctor will quickly and cheerfully advise him. His own common sense will tell him that he should eat sparingly of red meats, alcohols, sugars, salts, and heavy vegetables, and should browse among the lighter meats and vegetables, milk, egg, fish, and fruits.

Art of Cooking :--

Plain food cooked on slow fire is highly nutritious : The scientific explanation is given below.

Graphic diagram of various layers of a cereal.



The stable food of man begins in the vegetable kingdom : Boil cereals with water in an earthen vessel on a slow fire ; heat ranges from 160°F to 180°F . The result will be that starch granules swell up by their combination with diastase ; brisk fire breaks asunder starch granules into very fine particles, diastase is destroyed ; hence no swelling of starch granules.

The Hindu of yore appreciated the function of diastase on starch granules, far better than the so-called civilised Hindu of to-day who cook food on a brisk fire of coal and thereby destroy the action of diastase on starch. They cooked

food on a slow fire of wood or dried cow dung on an earthen vessel.

The best way to cook potato is by :—

- (1) Roasting in steam.
- (2) Boiling with its entire skin in water, and thus the insoluble earthy phosphates are retained.

When the potatoes are served on the table, peel off the skin gently and eat subsequently.

There is much to be learnt even from the uncivilised if we observe things with an eye of intelligence. The practice of preparing potatoes by the aborigines of Fiji island seems to me highly scientific.

They place a basketful of potato over hot stones sprinkling water from time to time, then they wrap it over with some impermeable muslin, the object being not to allow heat to escape. The potato is roasted on slow fire.

Of meat diet roast is good because the outer part is charred when put on fire, and thus prevents much heat to go inside ; the result is that inner part is cooked on slow fire.

The writer formulates the following golden rules which he has learned from experience.

1. Remember to rise up early in the morning.

The old motto

“Early to rise and early to bed

Makes a man healthy wealthy and wise.”

is impregnated with scientific meaning.

2. Remember to make a habit to go to privy at regular hour daily whether called by nature or not.

3. Remember to have some sorts of physical exercise daily at morning hour.

4. Remember to take some easily digested food *e.g.* toasted bread, butter and egg, or a cup of warm milk etc., before commencing morning work.

5. Remember to bathe daily on cold water; bathing in a running water in a temperate country like India is very healthy

6. Remember to masticate your food well so that saliva may do its respective work.

7. Remember to have varieties of diet; monotony is averse to Nature's Law.

8. Remember to drink as little water as possible during meal because it washes off the gastric secretion; but take a glass of water half an hour after.

9. Remember to have rest physical and mental half an hour atleast before and after meal.

10. Remember to lie down on left side or flat after meal, for half an hour in order to have full benefit of gastric juice.

11. Remember to take plenty of fruit juices.

12. Remember to have the full benefit of open air, sunshine etc.

13. Remember to go to bed early, but atleast half an hour after last meal.

The well known maxim.

“After dinner rest a while

After breakfast walk a mile”

ought to be known to every body.

14. Remember to take the tissue remedy when little out of health (Vide the Principle of Life.)

How to remain young.

“To drink of the waters of the fountain of youth” is still in the opinion of the writer within range of possibility. Man begins in a gelatinous condition and ends in an osseous or bony one. He is soft in infancy; he is hard in old age. Aging is a process of ossification. After middle life has passed a more marked development of the ossific character takes place. The arteries become thickened with calcareous matter, and there is interference with circulation, upon which nutrition depends. The whole change from youth to age is one of steady accumulation of calcareous deposits in the system. A man is old not by his age, but by his pulse. Entire blockage of the functions of the body is a mere matter of time, and the refuse matter deposited by the blood through the system stops the delicate machinery we call life. The blood contains compounds of lime, magnesia, and iron. In the blood itself are these earthy salts. In early life they are thrown off; in age they are not. Almost everything we eat contains these elements for destroying life. Earthy salts abound in the cereals, and bread itself, mistakenly called “the staff of life,” is one of the most calcareous of edibles. Nitrogenous food also contains these elements, hence a diet made up of fruit is best for people advanced in years. The

daily use of distilled water is, after middle life, one of the most important means of preventing secretions and derangements of health. Diluted phosphoric acid is one of the most powerful influences known to science for shielding the human system from the inconveniences of old age. Use it daily with distilled water, and so retard the approach of senility. Never let your costal cartilages become rigid if you can help it, but if they do, increase their function by respiratory gymnastics, use decalcifying agents, and lessen the intake of lime. To retain perpetual youth avoid all foods rich in the earth's salts, use much fruit, especially juicy, soured milk and take daily two or three tumblerfuls of distilled water with about fifteen drops of diluted phosphoric acid in each glassful. Thus will our days be longer in the land.

Old age : —

With the advance of senile-age the body begins to wane gradually. The large intestine and the arterial tree are affected first ; death so to speak commences in the colon :

The following golden rules are recommended : -

1. Drink a glass of hot water by sips early in the morning on an empty stomach.
2. Open bowel by rectal douches of tepid pure water once a week to wash off faecal matter, leucomen etc.
3. Avoid meat and highly seasoned dishes.
4. Take plain farinaceous food cooked on slow fire.
5. Drink pure water and avoid stimulant.
6. Take plenty of fruit juices.

7. Drink nature's own manufactured perfect food—milk as much as you can digest: also take curd, whey, soured milk, etc.
8. Avoid calcium salts.
9. The best forms of exercise are walking and massage.

MILK.

Milk is in reality an emulsion of fat containing proteids, salts and carbo-hydrates in solution in water.

Human milk is alkaline and sterile, its temperature that of the Human body (roughly just under 100°F.) ; its specific gravity fairly constant at 1030°F and it is antiscorbutic.

During digestion the gastric juice curdles the milk which consists of casein and fat or cream, while the sugar, (lactose), the soluble albumins (lactalbumin), and salts (calcium, partly in combination with citric acid and the rest as phosphates, sodium and potassium chlorides, magnesium phosphate and very little iron.) remain dissolved in water as whey. The curds are later on changed into albumoses and peptones by the digestive ferments.

The density of the clot which the milk forms in the stomach depends on :—

- (a) amount of casein in the milk.
- (b) degree of acidity in the stomach,
- (c) quantity of lime salts present.

Composition of human milk:—

1. Proteid, 1.5 per cent. :

Composed of :

- (a) Lactalbumen (0.8 to 1 per cent.), soluble form of albumen not curdled by acids coagulating 165°F.

(b) **Caseinogen** (0.4 per cent.). insoluble form of albumen ; forms a thick curd with rennin and acids ; not coagulated by heat.

(c) **Lactoglobulin**, soluble only a trace.

(d) **Nitrogenous extractives**.

2. **Fat** (4 per cent.) in emulsion.

3. **Sugar** (7 per cent.)

4. **Salts** (2 per cent.).

5. **Water** (87 to 88 per cent.).

Way to drink milk.

Drink milk by sips and allow the saliva to act upon it before it goes to the stomach so that it may not form a hard and indigestible curd.

Dr. Kellogg tells the story of his patient : -

“Well, one night I came home very hungry and thirsty, and sleepy besides. I thought I would not stop to eat supper, but went to the pantry and drank a quantity of milk. I was so thirsty and the milk tasted so good that I kept on until I had drunk as much as three pints. I went to bed and to sleep, but about three o'clock in the morning I awoke, feeling startled and smothered as if I were choking. I put my thumb and finger down into my throat and felt something sticking in it. I got hold of it and pulled out three yards of milk.”

CHAPTER III.

THE PRESERVATION OF LIFE.

“ Nature is not like a soft mother,
Over merciful in her treatment
She will avenge herself.”

Blackie.

The lamp of life lightened by celestial fire may extinguish abrupt by a gush of the wind of disease though wick and oil are *in situ*. To protect from such exposure, should be our goal. When the vitality is at par the process of ingestion and excretion is on an equal scale—we are in health. When this auto-protective power is below par the balance of income and expenditure is disturbed we are then out of health or what is commonly called diseased.

Health and disease are so to speak the bright and dark side of a globe. They are part and parcel of a wheel, we know not which will befall on us when; but it is admitted on all hands that violation of Nature's Law gives birth to disease.

Just as darkness is absence of light, so is disease lack of health. Bring in the light and the darkness is dissipated. Create health and disease disappears.

To be in herald of health vitality (auto-protective power) should remain un-impaired, *viz*: -

1. Various glands and blood-making organs have their physiological integrity.

2. Serum of blood should retain its opsonin-producing power.
3. Polynuclear leucocytes should abound, to digest easily the invading micro-organism weakened by the opsonin.
4. Sympathetic nervous system as well as cerebro-spinal system should continue in a normal state.
5. Body and mind should be in harmony with each other

When we are out of health from any of the above cause or causes, a process of auto-intoxication or self-poisoning undermines the sap of our system.

The Classical Symptoms are :

A drawn expression ; sunken eyes ; a furred tongue, bad taste, foul breath, frequently the so-called liver spots ; often the patient is pot-bellied and the skin is dry and harsh ; Nausea, thirst, shallow complexion, certain skin affections (acne, urticaria, etc.), anæmia, weak pulse, lassitude, anorexia, insomnia, loss of memory, inability to concentrate the mind, infantile convulsions ; it is quite common to have the bowels greatly distended by gases, shortly after meals, necessitating the loosening of the clothing ; the odour of the stools is sickening, while the stools are hard, lumpy and of small caliber, or semi liquid and mushy, and upon examination mucus and membranes are found. There is great fatigue and depression of spirits.

Headaches of various degrees of intensity ; Neuralgia is a frequent result of constipation. Loomis called it "a cry of the nerves for better blood."

A constant auto-intoxication leads to imperfect nutrition of the cellular elements of the body. The first to suffer are those of the lowest order, the fibro-elastic tissues which enter into the composition of the various fasciæ and suspensory ligaments of the viscera. As these cellular elements weaken under the influence of auto-intoxication, they no longer possess sufficient power to sustain the various viscera and ptosis occurs, gastropptosis, enteropptosis, colopptosis—all of which aggravate the condition by increasing the sympathetic shock or depression of the system, by decreasing the physiological efficiency of these various organs by diminishing the peristaltic action of the colon, allowing it to assume a V-like, or hammock-like, or festooned position, wherein faecal matter accumulates leading to further intoxication. Thus, we see that the initial habits of constipation which may at first result merely from removable causes, leads to a genuine vicious circle: that is, intoxication, colopptosis, faecal retention or impaction, which in its turn accentuates the auto-intoxication.

Acute Auto-intoxication leads to chronic auto-intoxication.

Acute and severe toxæmias overwhelm the organism with an unmistakable frankness, and a suddenness we were not prepared for. Chronic toxæmias, on the other hand, are insidious in their approach; they steal over us imperceptibly by daily degrees, in such a manner that when once their ravages are sufficiently marked to be recognisable, the malady has generally become established and resistant to treatment.

What are the main routes of infection in the body ?

The alimentary canal, the respiratory canal, the genito-urinary canal, are the chief.

Just as a skin abrasion opens a door to blood infection, a mucous surface abrasion also brings about a similar state of affairs. Of all these routes of infection, the alimentary canal is the one most exposed to injury of an autogenous nature.

The alimentary canal may be looked upon as a tunnel through the body, beginning at the lips and ending at the anus. It is practically a "thoroughfare"; and unfortunately, it is a thoroughfare where the traffic is allowed to go on with but little restriction imposed on it. The whole course of the tunnel, which means many feet of mucous membrane, is lined by cells that normally display a selective power on digested food materials, and a hostile attitude towards the injurious constituents of food.

Hæmorrhoids, anal fissure or fistula, prolapse of rectum etc. cause constant irritation in the sympathetic system by a constant degree of low shock, and at the same time causes actual sensation of pain through the cerebro-spinal system

The result being that all the functions of the body and patient's resistance (vitality) are lowered.

Mind has a marked physiological action on the vital processes of human organism.

Students of psychology know it well that anything which cheers up our mind *e.g.* joy, pleasure, cheerful temper, hopeful thought etc. raises the vitality, while anything which depresses us *e.g.* grief, sorrow, fear etc. lowers the vitality

throws the whole nervous system into a state of confusion, interrupts the vital functions for the time being and produces simultaneously a semi-paralysis of the nerves of the stomach ; gastric juices will not flow, and presto ! there is indigestion, The stomach has played truant or sulk and will do no good work.

Fright, fear and worry interfere with functions *under control of the will* and functions *not under control of the will*, and it is the latter which are really most important. The important functions of the body are those which are not under control of the will, but go on in spite of the will, under the guidance of the sympathetic system, and anything which influences them, for better or worse, influences the health in the same degree and direction. The alimentary tract is especially involved when the nervous system is upset by fear or worry, the influence being anywhere from a perverted taste to a relaxed sphincter. The gastric and other secretions are checked, and peristalsis interfered with. The latter may be increased. Respirations are quick and shallow, and the heart beats rapidly and with changed quality, which may be hard, thumping, or fluttering ; perspiration is often profuse, and large quantities of urine may be voided. The result is seriously impaired health, due to a broken-down equilibrium in cell metabolism.

The steps, then, from fright, fear and worry are perverted vital function, a broken equilibrium in the metabolism of the body, chronic functional disorders of a various nature, anatomical lesions, and a weakened constitution inviting more acute diseases.

Hopeful thought etc. on the other hand stimulates and energizes the body, restores to the organs their proper function through the sympathetic nervous system, returns the equilibrium, builds up a wasted system and helps to cure disease.

Our studies of anatomy and physiology demonstrate a nervous system of three parts: a peripheral nervous system of medullated fibers, associated with voluntary functions of the body, a peripheral system of non-medullated fibers, or sympathetic system associated with the involuntary functions of the body, and a central nervous system common to both. The voluntary acts are called those of conscious life, and the involuntary acts are called those of subconscious life, because unlike the medullated fibers, the sympathetic system continues to carry impulses and direct acts when consciousness is suspended by sleep or anesthesia. Competent scientific investigators are now demonstrating another quality of our subconscious life, a condition which is readily susceptible to outside influence with marked results upon the whole animal being possibly a function of the central nervous system comparable to the function of the sympathetic peripheral system, *i. e.* a subconscious mind in control of the subconscious activities. This is the state of suggestibility which is most apparent in hypnosis, and there seems to be every reason to believe that in this state we have one of the most powerful methods of administering suggestion by awakening an inner consciousness to assume control over the body which is beyond the power of the will. It is being used with success in the treatment of functional disease, and its full value is still to be learned.

One sign of mental health is serenity of temper and a self-control that enables us to bear with equanimity the petty trials and jars of life, especially those arising from contact with scolding, irascible, irritating persons. Serenity of mind comes easy to some and hard to others. It can be taught and learned. We ought to have teachers who are able to educate us in this department of our natures quite as much as in music or art.

Mental equipoise brings health and happiness.

Mental tranquillity is essential to physical welfare, and the body that houses a mind constantly disturbed by emotions is soon shattered, while the body that is fortified by the mental attitude of faith not only eliminates the intrinsic cause of disease, but can well withstand the advance of infection from without.

Let us now turn our eyes over the pages of bacteriology.

Normally, the intestine abounds with a microscopic flora composed almost exclusively of bacilli:

1. Some are non-pathogenic all through their phases *e. g.* lactic acid germs.
2. Some are non-pathogenic but when exceed physiological limits they become pathogenic *e. g.* putrefactive bacteria.

Harmless saprophytes securing shelter and abundant nourishment, become dangerous foes to the body. Herter believes that the chief significance of the obligate intestinal bacteria lies in their potential capacity for checking the development of other types of organisms capable of doing

injury, and that evidence is gradually accumulating to show that pathogenic micro-organisms may be present in moderate or even in considerable numbers in the intestinal tract under some conditions without giving rise to clinical manifestations of deranged function.

3. Some are pathogenic from the very beginning, but are kept in check by powerful leucocytes.

Human intestine harbours endless bacteria :

The two chief varieties of these are as follows :

Proteolytic microbes living on nitrogenous substances.

Amylolytic or saccharolytic organisms feeding on carbohydrates.

The latter are found mostly in the small intestine, while the former are chiefly in the large and are mainly responsible for toxic products—poisons originating in cell destruction and food putrefaction.

N. B.—“Tissier, Massol, and Grigoroff have proved that the proteid-destroying bacilli are unable to live in an acid medium. We have, therefore, two methods at our disposal to combat intestinal auto-intoxication, *i.e.*,

(1) by rendering the intestinal area acid :

(2) by introducing into the intestine, bacilli directly antagonistic to those which attack the proteids.”

The decomposition of albuminoid substances induced by the fermentative processes which take place in alimentary residues during their stay in the large bowel is responsible for the production of a series of toxins of varying degree.

End product of Protein metabolism.**1. Aromatic group of protein molecule viz :—**

Leucin, tyrosin, tryptophan.

(a) Leucin forms valerianic acid.

(b) Tyrosin yields phenol.

N.B. Phenol is closely related to indol chemically.

(c) Tryptophan : It yields indol and skatol.

2. Sulphur group of protein molecule yields.

(a) Carburetted hydrogen.

(b) Sulphuretted hydrogen.

Rarely sulphuretted hydrogen is absorbed and forms a toxic compound with hemoglobin causing a peculiar form of cyanosis.

3. Butyric acid.**4. Ptomaines: such as neurin, cadaverin and muscarin.**

Ptomaines are toxic but changed to less toxic bodies and eliminated by the stools. Whenever their number is very great, relief is obtained by a profuse intercurrent diarrhoea, while the remaining toxic bodies, having been acted upon partially by the digestive mucosa, are changed in the liver, then enter the circulation, and being further changed by the antitoxic glands, finally are eliminated through the skin, kidneys and lungs.

Their passage through the sweat glands determines local irritation that gives rise to various cutaneous eruptions. Eliminated by the kidneys they cause a low form of irrita-

tion which, in the long run is followed by sclerotic changes in the renal parenchyma concurrently with thickening of the arterioles and a rise of blood pressure. The presence of these toxins in the blood constitutes a state of chronic auto-intoxication, the effects of which are particularly noticeable on the nerve centres, causing somnolence, physical and intellectual depression and vaso-motor disturbances *e. g.* flushing, erythema, &c.

In conclusion when the bacterial action exceeds the physiological limits gases and leucomen are formed in the intestine; when some substance analogous to caffeine is developed in the intestine, the result is sleeplessness, when some substance analogous to morphine is formed the result is profound sleep; when certain substance analogous to strychnine is manufactured in the laboratory of the intestine the result is spasm which generally occurs in children.

The constitutional effects of this chronic intoxication are aggravated when in addition to excessive production, there is defective elimination, as is the case in persons with damaged kidneys, in whom it may precipitate an attack of uræmia.

Under normal conditions the larger portion of the small intestine shows exclusively aerobic bacteria, and not until a short distance above the ileocecal valve do anaerobes, which are considered to be the sole cause of putrefactive changes in proteid, begin to appear. With lack of oxygen, that is, most probably in anæmias, the anaerobes spread further upward in the digestive tract and in this way augment the amount of toxins, which are strongly hemolytic in character.

THE CYCLE OF BACILLI.

The microbes play a decided role in interfering with metabolism, and thus forming abnormal chemical bodies (toxins) which act like poisons.

Normal inhabitants of the bowel by staying beyond their proper limits may produce definite infections—thus the *B. coli* may set up cystitis, pyelitis, cholecystitis, or phlebitis, and the streptococcus faecalis can engraft itself on to heart valves damaged by rheumatism.

Toxins circulating in the blood will affect not only the large glands, such as the liver and kidneys, but the blood glands also and, finally, the nerve system and muscular apparatus will be interfered with.

Bouchard has, in fact, rightly declared the human digestive canal to be a "poison factory"; where physiology ends and pathology begins in this relation it is not easy to define.

When the body may fail to neutralise the soluble poisons produced by bacteria an intoxication results.

There are two main lines of defence against the microbe and its toxin.

1. The prime factor.
2. Several lines of outposts.
4. The prime factor :—

Phagocytic power of white blood corpuscles, and the anti-toxic properties of blood serum.

These may be termed the reserve force held in readiness to encounter the invading intruders.

2. Several lines of outposts. :- -

(a) Epithelial resistance.

(b) Antitoxic functions of the liver.

In the mouth, the vitality of the epithelium and the healthy buccal secretions weaken, entangle and expel bacteria through the expectoration.

In the pharynx, the tonsillar and other lymphoid are the advance posts of defence. When they are diseased, and afterwards hypertrophied they harbour millions and millions of bacilli in their crypts. The healthy oesophageal tube does not allow of oral infections to spread by mucous continuity to the stomach—(as we infer from a diphtheritic infection limiting itself above the oesophagus).

In the stomach, the hydrochloric acid of the healthy gastric juice has germicidal properties; if the toxic body is sufficiently irritating, emesis is induced as a safe-guard.

In the duodenum the bile and other juices exert a certain amount of bactericidal property.

If the intestinal reflex is sufficiently sensitive and no obstructions exist, a timely diarrhoea saves the body from a general systemic infection.

The next important post of defence is the liver. Poisons of various kinds are destroyed or neutralised here, and converted into innocuous bodies excreted without much disturbance of the general health.

When all these safe-guards have failed, the toxic bodies have entered the general circulation, and now the "reservists" are called upon to defend the body from threatened extinction.

(1) The leucocytes put into operation their phagocytic weapons on the organisms intruding into the blood stream.

(2) The toxicity of the poisons is neutralised by certain antidotal substances already present in the blood serum or induced to appear by the stress of infection. These are the alexins (from leucocytes), the antitoxins, the bacteriolysins, the opsonins, - bodies of undetermined composition.

The great seat of putrefactive change is the large intestine.

In fermentative dyspepsia carbohydrates may give rise to oxalic acid, causing oxaluria; more commonly they are a source of lactic acid, which is antagonistic to putrefaction.

Proteins putrefy, carbohydrates ferment, and to a certain extent these two processes are antagonistic.

Fats produce fatty acids as a result of bacterial action, but these are not toxic.

Three types of intestinal putrefaction :

1. *Indolic*, due to the *B. coli* and perhaps the *B. putrificus*. The commonest form is in marasmic, large-bellied children with chronic intestinal indigestion. Carbohydrates are not well borne, while proteins and fats are digested more readily. The subjects are sharp-witted; they are intolerant of cold, and are easily fatigued. The indican and other ethereal sulphates are markedly increased in the urine. For treatment the writer advises that the carbohydrates should be restricted to well-cooked rice or biscuits. Milk should be peptonized for a time, and a moderate amount of finely divided meat given. Gelatin may be useful, because it contains no tryptophan, the precursor of indol. A few rather generous meals are better than frequent feeding. High irrigation of the bowel may be beneficial.

2. *Butyric*, chiefly due to *B. aerogenes capsulatus*. The bacterial action sets free nascent hydrogen which causes much reduction of the bile pigment, so that there is excess of urobilin in the fæces and urine. Addition of a strong solution of mercuric chloride to the fæces produces a red colour, which is more distinct on throwing the fæces into water. There is little or no indican in the urine. Indefinite invalidism may be the chief symptom. The subject is often sour-smelling; the epithelium of the tongue and mouth is seen to be desquamating. Hence the irritable condition of the alimentary canal, with the tendency to diarrhoea. Shreds of epithelium may be seen in the fæces. Herter finds that faecal extracts may be hæmolytic in advanced cases. At this stage anæmia supervenes—first a diminution in the blood volume, then of the hæmoglobin, and then of the red corpuscles.

3. *Combined Indolic and Butyric*.—Under this Herter describes a type in which nervous symptoms occur relatively early. The subjects become invalid more rapidly than with either indolic putrefaction or butyric fermentation separately. The outstanding features of the case are mental depression and muscular fatigue.

Finkelstein believes that micro-organisms do not play an important role in the etiology of intestinal diseases but lays the whole stress to products of the metabolism of food. Metchnikoff, on the other hand, holds that bacteria are the prime factor of intestinal diseases.

Prof. Metchnikoff attributes this to anaerobics, *i.e.*, to the following three bacilli:

(1) *B. putrificus*, which plays a predominant role in cadaveric putrefaction as well as in the putrefaction of butcher's meat and of milk. This bacillus, he says, is unquestionably an inhabitant of the human intestines. This view is also held by Rettger and others.

(2) *B. sporogenes*, which is found in the intestinal contents, not only in the form of spores, but also in its vegetative condition; it belongs to the group of septic vibrios and must be classified among the bacteria of putrefaction.

(3) The third bacillus, *i. e.*, *B. capsulatus aerogenes* (gas bacillus), is universally admitted to be an inhabitant of the intestinal canal capable of producing putrefaction.

According to Faloise, Finkelstein, Malvoe and others, intestinal putrefactions are harmless. On the other hand, Metchnikoff, as well as many others, believes that the putrefactive bacteria of the intestinal canal are able to constitute a source of infection and to poison the organism.

Strasburger has estimated that in the normal adult, bacteria comprise one-third the weight of the dried stool. Steele states that the diet is the most important factor in determining the amount of bacterial growth in the intestines. Foods that are easily digested and well absorbed comparatively early in their passage through the gastro-intestinal tract, leave little or no residue on which the bacteria can live.

Diseases caused by auto-infection.

1. Skin diseases *e.g.* pruritus, urticaria, eczema, furunculosis, etc.

2. Recurring Coryza,

Dr. P. Cornet (*Presse Med. Paris, January 16, 1909*) emphasizes the well-understood fact that persons suffering from recurring attacks of coryza—"cold in the head"—of varying degrees of severity and in many instances subjects of auto-intoxication. They have frequently a clearly defined arthritic diathesis—a tendency to sluggish elimination. It must be remembered, that the nasal mucosa is an *excreting* membrane as well as a secreting organ. Imperfect digestion following errors in diet may cause marked congestion of the face; the reflex irritation from the digestive organs distends the vessels, the face grows red and hot and consequent overwork of the glands in the skin results in a greasy, pimply surface.

3. Neuritis and its relation to intestinal putrefactive processes.

The etiology of some nervous affections *e.g.* neuritis, which seems to be toxic, can be directly traced to toxins, which result from putrefaction of undigested material in the intestine.

4. *Tetany* is another condition which has been held to be due to a gastro-intestinal intoxication. Its occurrence in rickets, with gastro-intestinal disturbances, in typhoid fever, enteritis, appendicitis, diseases of liver, pancreas and bile-ducts. It is generally admitted that persistent alimentary poisoning is a common cause of arterio-sclerosis, neurasthenia, anaemia, nephritis, and in certain subjects predisposed thereto diabetes.

Treatment of auto-infection and auto-intoxication.

Liberal use of water internally—drinking between meals two or three quarts of water daily is recommended.

Remember Abbott's rule :--

Clean out, clean up and keep clean.

Clean out bowel by: (i)- flushing from above (calomel and podophyllin followed by a saline.)

(ii) -flushing from below (sulpho-carbolate of zinc in warm water enema.)

(i)

R.

Calomel gr. 1/10

Podophyllin gr. 1/24

Repeat every hour for eight or ten doses, followed by Rochelle salt $\frac{1}{2}$ ounce in six ounces of hot water, every two hours until the stools are watery.

(ii) The bowel should be made aseptic by the use of sulpho-carbolate of zinc, gr. x, to one quart of water used by enemata, retaining as much of it as possible.

The object is to keep the intestine as clean as possible.

To keep bowel clean.

(1) Use phenol-phthalein in tablet form or as syrup : one or two tablets every night sufficient, and later to be reduced in frequency.

(2) Foods like shredded wheat and systematic deep-breathing, will assist drugs.

(3) Bile-salts, as cholagogue to relieve such symptoms as offensive breath, coated tongue etc.

Intestinal antiseptic : -

Benzo-naphthol, salol, naphthalene tetrachloride, sulpho-

carbulates, manganese dioxide, agar agar soaked in hydrogen peroxide and flavoured, ichthyol, calomel. etc.

Treatment of Intoxication.

J. E. Abelous and E. Bardier (*Comptes Rendus Soc. de Biologie 1910, P. 43*) injects 0.05 gram of sodium nucleinate and remarks that it increases resistance to intoxication due to leucocytosis and direct antitoxic effect.

Lactic acid ferments :

Prof : Metchnikoff advises the introduction of lactic-acid-producing organisms, which are antagonistic to the growth of the putrefactive bacteria.

It is an established fact that there exists a strong antagonism between the production of sulphuretted hydrogen gas (due to functional disorder of intestine) and lactic acid fermentation ; since these two products of food decomposition are never found in the stomach at the same time ; besides Bacteriological researches have shown that lactic ferments are the true enemies of putrefaction.

From soured or fermented milk, lactic acid is produced in a nascent state in the intestine, and has two-fold actions viz :-

(i) The poison-forming germs are put to a disadvantage and unable to grow, so that the formation of toxins which might be absorbed and cause damage is arrested.

(ii) It has a laxative effect and promotes peristalsis.

Dietetic treatment—Cut proteids to a minimum, give chiefly cereals and other starches, and supply assimilable fats guardedly. Avoid substances rich in putrefactive

organisms, such as, high game, strong cheese, and smoked, tinned and preserved meat generally. A little lean meat or vegetables rich in protein may, however be allowed to avoid loss of weight. Gelatin, junket, whey, and buttermilk often valuable. Fermented milks are especially useful when stomach is deranged and in gout and arteriosclerosis as well. Where hyperacidity and spasmodic pain are prominent, give hot olive-oil. Forbid tea, coffee and alcohol, and encourage drinking of distilled water.

HYPERCHLORHYDRIA & HYPERSECRETION.

Hyperchlorhydria means an abnormal secretion where the gastric juice contains an increased amount of hydrochloric acid in the unit of quantity.

Hypersecretion means a quantitative change of secretion there being more juice but containing a normal amount of hydrochloric acid in the unit of quantity. Hence in hypersecretion, there is either an increased quantity of juice, or a modified motility of the stomach, or both factors combined.

Pathological function is in most cases only a modified or exaggerated physiological function.

In a very careful study, Rubow* has shown that there is not a single case in the literature where the total acidity has been higher than 100-150, except, of course, in those cases in which the fact has been overlooked that other acids than hydrochloric acid have been found (for instance lactic acid in consequence of retention.)

Rubow :—*Archiv für Verdauungskrankh* 1906.

The gastric secretory apparatus is, indeed, wonderfully regulated and pours, under normal conditions, just as much juice into the stomach as is necessary, with regard to the digestive work to be done.

The really pure gastric juice is the product of the oxyntic and principal cells. This juice is a clear fluid and contains 0.4—0.55% HCl (which is equal to 100-150 cc. of 1/10 normal hydrochloric solution) and varying amounts of pepsin and rennin. It is very difficult to obtain the pure juice of the stomach glands, because there is always more or less gastric mucus upon the surface of the gastric mucosa, besides the swallowed saliva and mucus of the mouth and throat, which we will not consider. This mucus is alkaline; it binds partially the hydrochloric acid and influences in this way the acidity of the juice. The more gastric mucus is mixed with the specific gastric secretion, the more is this alkalinized.

The less mucus is poured into the stomach, the less the gastric juice is diluted and the nearer it is to the normal acidity. We, therefore, have to make a distinction between the *physiologic conception of the gastric juice*, i.e., the pure secretion of the specific gastric glands without the gastric mucus, and the *clinical conception*, i.e., the juice with the gastric mucus.

Pawlow's observation.

If a dog is operated upon and a sham-feeding is given, it is possible to obtain the gastric juice from the fistula. When it is collected from time to time as it pours out from the fistula, it can be shown that the different portions vary with regard to quantity and acidity. At the beginning and

at the end of the secretion there is more mucus mixed with the juice and acidity is less.

When the gastric secretion is at its height, there is only a small quantity of mucus visible and the gastric juice has a constant acidity.

A new phase in the understanding of these problems began with the work of Pawlow¹ and his pupils, and with the studies of Cannon² on the motility of the stomach. New facts have been brought forward and added to the physiology of secretion and motility.

Gastric Secretion is affected in two ways :

1. The quantity of the juice.
- II. The motility of the stomach.

We know that there are two sources for the gastric secretion. One is psychic, the other reflex. The psychic stimuli of the secretion play an important part, but their effect is small in comparison with the stimuli arising from the presence of food in the stomach. It seems to me very probable that the latter stimulus will have to be held responsible as the main etiologic factor of hypersecretion.

The remarkable discoveries of Starling and Eddins have proven that this part of gastric secretion is stimulated by certain chemical bodies of specific nature. They call them hormones—(messengers). These hormones are formed in the mucus membrane of the pylorus and duodenum and stimulate secretion after circulating in the blood.

* Pawlow: *Work of the Digestive Glands*, London 1903.

† Cannon *Amer. Journ. of Physiology*, 1907.

From this point of view, it might be possible to explain why the local affections of the pylorus and duodenum are so prone to induce hypersecretion.

Cannon's most interesting studies have elucidated the physiology of gastric motility to a point of completion. Through them it became apparent how closely secretion and motility are linked together.

It is the hydrochloric acid within the stomach which opens the pyloric muscle, and it is the hydrochloric acid which, as soon as it reaches the duodenum, closes the pylorus.

Both effects are reflexes. There is no doubt that the amount of hydrochloric acid which passes the pylorus will influence the mode in which the stomach empties itself of its contents.

Thus, the acidity in the stomach may become the factor which under certain conditions, increases its own amount by disturbing the normal pyloric rhythm.

For treatment the reader is requested to read page 253 of my *Treatise on Treatment*.

ACIDOSIS AND ACID INTOXICATION.

Cell metabolism chiefly of fat and perhaps proteid is disordered. Tissues of the body but fatty tissue in particular, are affected. Cell degradation or autolysis is brought about by intracellular ferments. Autolysis goes on rapidly, not only in the liver, but in the muscles and tissues generally.

Breaking down of cells leads to the formation of oxo-butyric acid, and its derivatives, diacetic acid and acetone,

and hence acidosis. The term "acidosis" is not strictly correct, as these organic acids immediately combine with alkali bases to form neutral salts, and which are excreted as such, and therefore the condition is really a "diminution of alkali" rather than an "acidosis."

The term "acidosis" is correct only for severe cases. In these the body has exhausted the natural alkalies of the food, the ammonia protection has been called upon, and finally the tissues are left devoid of their bases, and in an acid condition. They can be shown to be intensely acid by the way the whole protoplasm takes up basic dyes.

Ammonia Protection.

An indication of this is the high ammonia content of the *fresh* urine. The ammonia coefficient would indicate the graveness of the condition, for it would show that the body was back upon its second and last line of defence against an acid intoxication. It is the oxybutyric acid, which is most toxic, aceto-acetic acid in a less degree, and acetone least toxic of all.

Acidosis is due partly to inability to utilise food owing to poor digestive function and partly to an intestinal toxæmia. The mechanism of the gastro-intestinal tract is deranged, permitting intestinal putrefaction and fermentation to go on apace. It is a significant fact that in cases of marked acidosis and acid intoxication, the writer finds indican, a sign of intestinal decomposition, not infrequently excreted in the urine.

Normally, there is a function of the liver, namely, that of converting the acetone bodies, as rapidly as they are

formed, into other end products, though it is not known what these are.

An immense amount of poison is carried to the liver and interferes with its function, particularly the detoxicating function, so that toxins absorbed from the bowel, and usually neutralised in the liver, now escape into the general blood stream, and such symptoms as headache and drowsiness etc are produced.

Causes of acidosis and acid intoxication.

1. *Simple starvation*:—or a diet of proteid and fat, without carbohydrate, viz., carbohydrate starvation.

2. *The effect of fevers*:—

e.g., (a) Typhoid fever.

(b) Acute rheumatism.

(c) Pneumonia.

3. *Auto-intoxication from the Gastro-Intestinal Tract*:—

e.g. (a) Acute gastro-enteritis.

(b) Acute dyspepsia, particularly after too much meat diet.

(c) Typhoid fever.

(d) Acute appendicitis.

4. *Burns and Scalds*:—particularly if the burn be superficial and extensive.

In burns acid intoxication is brought about by toxic spoiling of the intestinal tract by the burn toxin, allowing an intestinal auto-intoxication to occur. Just as the kidney is injured in the excretion of the scarlet fever, diphtheria and

pneumonia toxins, so may the intestinal mucous membrane be spoilt, and thus its selective absorptive power greatly diminished. In this way the body runs the risk of an intestinal toxæmia, with a resultant acidosis and even acid intoxication.

5. *Drugs* :—Sodium salicylate is the only drug which causes an acid intoxication.

6. *Anæsthetics* :—Chloroform and ether.

7. *Diabetes Mellitus* :—In diabetes the acidosis is due to inability to utilise and metabolise carbohydrate. In the tissues and organs the store of carbohydrate is low, so that a rigid carbohydrate free diet often precipitates an acid intoxication.

Signs and Symptoms of Acid Intoxication.

In mild case :—Nausea, vomiting, headache, drowsiness and irritability, are commonly observed. Vomiting is usually marked, and there is a sweetish or fruity odour about the breath and urine. The tongue is coated, and the child looks toxic, with sunken eyes; the pulse rate and temperature rise, and there may be abdominal pain, which may be generalised over the abdomen. The tenderness is always high up in the three uppermost areas, as if the spleen, pancreas and liver are affected. The abdomen is rather sunken and carinated, and there may be some resistance, but no rigidity of the abdominal walls. Early in the attack there may be constipation, but this is often followed by small, loose motions. Dr. Gordon Sharp considered it a hopeful sign.

In intense case :—The vomiting may be incessant: the

patient is restless and delirious, and the respirations are of the "air hunger" type; finally coma and death supervene.

The Relation of Acidosis to the Carbon Dioxide of the Blood in Diabetic Coma.

Dr. Pavy in his lectures on the *Pathology and Treatment of Diabetes Mellitus* remarks :—

1. In prolonged acidosis the patient shows a well-marked hyperpnea.
2. The "alkalinity" of the blood—that is, its power of combining with acids—is reduced.
3. The quantity of carbon dioxide in the patient's blood is materially diminished.
4. Carbon dioxide begins to accumulate in the tissues.
5. Carbon dioxide is the normal stimulus of the respiratory centre and, therefore, the centre is, at first, stimulated to greater activity. The accumulation, however, of carbon dioxide leads to a cessation of its production; and, as Dr. Pavy says "death takes place when the non-removal has attained a sufficient height to reduce the occurrence of activity to a point which is no longer consistent with the continuance of life."

If sufficient alkali such as sodium bicarbonate is given by the mouth or is injected into a vein the "alkalinity" of the blood and its carbon dioxide content are increased, and the symptoms of coma may disappear, at least temporarily. When coma is imminent the patient's appetite becomes extremely poor, and during coma the metabolism of the body, as judged by the output of dextrose, nitrogen, and carbon-dioxide, is greatly decreased.

Drs. A. P. BEDDARD, M. S. PEMBREY and E. I. SPRIGGS, (*The Lancet*, June 19, 1909 p. 1741) on the other hand remark :—

In the first place, so long as the body is alive it will continue to produce carbon dioxide. Whenever the blood is unable to remove it as fast as it is produced, carbon dioxide must accumulate in the tissues, and if it accumulates then its tension in the tissues must be raised. Unfortunately, there is no method of estimating directly the carbon dioxide tension in the tissues : but it is generally assumed that the tension of carbon dioxide in the renal cells would not be raised without that in the urine being correspondingly increased. We have shown that the tension of carbon dioxide in the urine in diabetic coma is not raised.

In the second place, if the “alkalinity” of the blood begins to fall, and if carbon dioxide begins to accumulate at an increased tension in the tissues, the blood in the capillaries must be exposed to an increased tension of carbon dioxide. And although the reduced “alkalinity” of the blood might prevent its taking up a normal quantity of carbon dioxide, nevertheless such gas as the blood did take up would be under an increased tension. The tension of the carbon dioxide in the blood can be either estimated directly or deduced from an analysis [of the alveolar air. By the former method we have found that it is at any rate not increased and by the latter that it is, as a matter of fact, diminished even to a fifth of its normal value, and that this decrease is greatest during coma, but is obvious for days both before and after the coma.

In the third place, it is pointed out that if an alkali is

injected into the blood the symptoms of coma cease temporarily; the explanation being that the alkali has increased the power of the blood to combine with carbon dioxide.

We have shown by direct experiment not only that the tension is not raised but that the blood is not saturated even for a tension of carbon dioxide below the normal. Further, if the arm of a patient is bandaged for a sufficiently long time—such, for instance, as two minutes—before the blood is drawn, the carbondioxide content of the blood can be raised even up to the normal. In fact, the blood in coma and the precomatose state can combine with very much more carbon dioxide than it actually contains.

Dr. A. P. BEDDARD, M. S. PEMBREY and E. I. SPRIGGS, have come to the conclusion that the decrease of carbon dioxide in the blood in diabetic coma is not due to the inability of the blood to combine with more carbon dioxide than it is found to contain but demands some other explanation as sketched below.

Blood is both alkaline and acid in the sense that it can combine with acids and alkalies. Physico-chemical investigations upon the relative concentrations of acid and basic ions in blood show that in health its reaction is always roughly neutral, approaching that of distilled water. Strictly speaking, the reaction of blood is alkaline to such a slight degree that it may be referred to as being neutral. The reaction of lymph, tissue-fluids, and protoplasm is presumed to be the same as that of the blood. It is probable that the slightest disturbance of this chemical neutrality affects the metabolic activity of protoplasm, and

that but a very little upset of the neutrality towards the acid side is incompatible with life. During metabolism carbon dioxide and other acids are continuously produced. In the case of distilled water, the least addition of carbon dioxide or other acid destroys its neutral reaction, but in the case of blood and protoplasm owing to their carbonates, phosphates, and proteins, considerable quantities of carbon dioxide and other weak acids can be added without altering their reaction and destroying their neutrality. This power of the blood and protoplasm to combine with acids without change of chemical reaction has been called by B. Moore "reactivity" to acid.

During the prolonged and severe acidosis of diabetes the bases become combined with abnormal acids, and are no longer available to combine with the normal acid products of metabolism; hence the range of "reactivity" to acids of the blood and protoplasm is diminished. On this account during severe acidosis the neutrality of the body would be imperilled by relatively smaller doses of its own metabolic products. The cells would be less capable of withstanding the acid properties of their metabolites and would become more sensitive to the physiological action of all acid substances. In the terminal stages of acidosis the quantity and tension of carbon dioxide in the blood are progressively reduced, not because the blood cannot take up more carbon dioxide than it is found to contain (*Pary's theory*) but because the rising concentration of acid ions in the blood and protoplasms progressively affects the activities of cells. It has been shown by many observers that the quantity of carbon dioxide in blood under comparable conditions of experiment

runs parallel with and may be taken practically as a measure of the power of the blood to neutralize acids. As the power of neutralizing acid substances manufactured during metabolism progressively falls, tissue activity correspondingly decreases, and less carbon dioxide and other acid substances are produced. Also, the respiratory centre is stimulated to greater activity and the hyperpnea pumps carbon dioxide out of the blood. We have shown that the diminution of carbon dioxide in the blood is present for days before coma begins and lasts for days after coma has passed off. During coma this change is associated with a great increase of the total pulmonary ventilation and a great fall of the carbon dioxide in the alveolar air. Before coma begins and after it has passed off there is still present a marked fall of carbon dioxide in the blood and alveolar air, but it is less in degree than in coma.

We conclude, therefore, that the low percentage of carbon dioxide in the patient's blood and alveolar air is due not to his blood being unable to take up more than it was found to contain, but

- (1) to a diminished production of carbon dioxide by his tissues,
- (2) to the rapid removal of carbon dioxide by the hyperpnea,
- (3) to an increased sensitiveness of his respiratory centre to carbon dioxide.

It is necessary to explain the onset of the hyperpnea.

Haldane, Priestley and others have shown that in health carbon dioxide is the chief stimulus to the respiratory centre.

Hence the writer concludes the following grand truths in prolonged acidosis and acid intoxication (*Diabetic Coma*): -

- (1) the quantity and tension of carbon dioxide in the blood are low,
- (2) there is no accumulation of carbon dioxide in the tissues,
- (3) hyperpnea begins and continues irrespective of carbon dioxide.
- (4) the respiratory centre is stimulated by unneutralized acid substances.

In diabetic coma the respiratory centre is not stimulated to greater activity, as it is in health, by a slight increase of carbon dioxide in the blood. A patient in coma was given air to breathe containing 2.6 per cent more carbon dioxide than was in his alveolar air and the hyperpnea was not increased. The same patient, three days' later, when he was conscious and his hyperpnea had disappeared, was again given air to breathe containing 2.6 per cent more carbon dioxide than was in his alveolar air, and his hyperpnea returned at once. Carbon dioxide is also an acid substance, and although it may be the principal, it is by no means the only, acid substance produced even in normal metabolism, much less in severe diabetes. The effective stimulus to the respiratory centre in coma is the increasing concentration of unneutralized acid substances.

E. I. Sprigg's view regarding acidosis.

The decreased "reactivity" of the protoplasm of the cells due to the prolonged acidosis renders their reaction more easily disturbed by, and therefore makes them more sensitive

to, the stimulating influence of any acid body, including carbon dioxide and other acids produced during metabolism. As the acidosis increases the metabolic activity of the tissues is thereby slowly and progressively diminished until consciousness, and finally life, is no longer possible.

An indirect method of determination of the degree in acidosis is by the determination of the ammonia content of the urine. Normally about 3%, in disease as much as 50%, of the nitrogen excreted in the urine is in the form of ammonia.

Treatment:—

The indications for treatment are :—

1. To combat acid intoxication by supplying the deficient alkali bases, and thus endeavour to break the vicious circle in autolysis.

(a) Writer's formula :—

℞.	
Sodii Bicarb	3. i
— Citras	3. i
Aq:	0. i

Dose ad libitum.

(b) Gordon Sharp's formula .—

℞.	
Carbonate of magnesium	gr. xxxvi
Sodium bicarbonate	gr. xxiv
Pulv. tragacanth	gr. iii
Glycerine	5. ii
Peppermint water	3. iii

Dose—Two teaspoonfuls every one or two hours with or without water or aerated soda water.

2. To prevent further formation of the acetone bodies by diminishing fat in the food and by giving

carbohydrate, but excessive use is decidedly harmful by causing gastro-intestinal indigestion.

3. A saline purgative.

4. Plenty of cold water, or aerated soda water.

Special treatment for each individual case :—

1. *Starvation* :—

Judicious feeding makes him all right.

2. *Acute Febrile Diseases* :—It clears up under ordinary dietetic treatment.

3. *Gastro-intestinal disorders* :—

(i) Push alkali (sodii. bicarb. and potass. citrate) by mouth.

(ii) Give diluted milk and carbohydrate; as sago or arrowroot.

(iii) If the case is a grave one, and vomiting is incessant, then give alkaline and normal saline solution per rectum, with or without 10 per cent. dextrose (two ounces to the pint).

4. *Acid Intoxication after Burns and Scalds* :—The usual treatment is indicated, and it is wise to restrict, as far as possible, for prophylactic reasons, the use of an anæsthetic in dressing such cases.

5. *Post Anæsthetic Acid Intoxication*.—Drs. F. H. Wallace and E. Gillespie (*The Lancet*, Dec, 5, 1908, page 1665) recommend that so far as prophylaxis by drugs is concerned glucose has a much greater power in controlling the acetonnurin than sodium

bicarbonate, that the secondary vomiting is in direct relation to the amount of acetone produced and that in cases of vomiting lasting over 12 hours the stomach should be washed out with a solution of sodium bicarbonate leaving some fluid in that organ.

6. *Recurrent or Cyclical Vomiting in Children*:—

Tinc. opii	m. i
Tinc. Lavender Co.	m. v
Glycerine	m. v
Aq :	℥. i

Dose—Every hour till rest is obtained.

7. *Diabetes*:—Milk diet thickened with carbohydrate and by alkali treatment.

INDICANURIA AND INDOLACIDURIA.

The simplest ways to prove the presence of the intestinal proteid putrefaction are:—

1. the presence of indican and indolacetic acid in the urine.

2. the presence of indol and skatol in the stool.

They impair vitality and shorten life. They are evidences of absorption of the decomposition-products of proteids in the intestinal canal—the most important workshop of digestion.

**Proteid decomposition
Yields
Tryptophan.**

When tryptophan is acted upon by *Bacilli coli* and *Bacilli Proteus*, the normal resident of the bowels *Indol propionic acid* is formed.

We are still in the dark under what conditions and through what stages of decomposition indolpropionic acid yields indol; hence we conclude it is the source of **Indol**.

1. Indol is less stable.
2. It is more readily attacked by bacteria.

3. It is absorbed in the form of Indoxyl, combined with sulphate conjugated in the liver as Indoxyl (ethereal) sulphate which is practically harmless, and excreted in the urine as indoxyl sulphate or Indican, producing a condition known as **Indicanuria**.

Bacilli coli certainly, and *Bacilli Bifidus* probably are able to form Indolacetic acid from tryptophan.

By heat indolacetic acid is decomposed into skatol and carbon dioxide; hence we conclude it is the source of **skatol**.

N.B.—It is extremely doubtful if indolacetic acid ever breaks down with the production of indol.

1. Skatol is stable.
2. It is less readily attacked by bacteria.

3. It is an established fact that the mother substance indolacetic acid appears in the urine producing a condition known as **Indol-aceturia**.

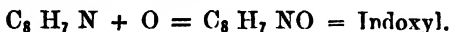
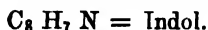
INDICANURIA.

Indicanuria or the presence of indican in the urine is due to absorption of indol, a product of protein decomposition in the

(1) workshop of digestion—a factory of considerable and vital importance, on whose perfection of function, the well-being of the entire human mechanism depends and

- (2) elsewhere *e. g.* from the sites of various foetid suppurations and gangrenous processes in different parts of the body. (*Jaksch*).

Its chemical formula.



(*Landois Stirling's Physiology*).

Various views about indol formation.

1. Prof. L. Landois holds that Indol is derived from Tyrosin by decomposition—Tyrosin itself being one of the products of pancreatic digestion of albuminates, and lays stress on the large intestine as the site of Indol-formation. He says“ Pancreatic digestion of albuminates does not proceed beyond the production of Amido acids, Leucin, and Tyrosin and others. Putrefactive decomposition in the large intestine causes still further and more profound decompositions. Leucin forms Valerianic acid, Glycin behaves similarly, Tyrosin breaks up into Indol. These products of putrefaction are wanting in the intestines of the foetus and the new-born. Among solid matters in the large intestine produced only by putrefaction, Indol is specially to be pointed out.”

2. Prof. Sahli says that Trypsin of pancreatic juice favours decomposition of proteids and formation of Indol. In the small intestine, Trypsin being most active, Indol is largely formed, decomposition being favoured. So in obstruction of the small intestine, we find an abundance of Indicanuria, whilst in obstruction of the large bowels, we

do not find much of it until quite at a late stage. The reason given by Sahli is that "the Trypsin cannot operate well in the large intestine, for it is destroyed there or is re-absorbed, as is well-known." He also goes on saying that if the pancreatic duct be occluded, the amount of Indican in the urine would be diminished; and so in such cases, conditions which favour formation of Indol, e. g., jaundice or a meat diet, do not give rise to marked Indicanuria and so it becomes of diagnostic importance as signifying occlusion of that duct. The fact is, however, that Sahli throws large intestine as the site of Indol-formation into the back ground.

3. Prof. Salkowski holds that both Skatol and Indol result from a common substance preformed in albumin which when decomposed, gives rise to Indol, sometimes to Skatol, according as conditions favouring Indol forming bacteria or Skatol-forming bacteria prevail. But really Indican of the urine is an oxidation product of both Indoxyl and Skatoxyl, and Skatol is only Methyl-Indol (*Henslett's Bacteriology*) and the Skatoxyl is often formed in much smaller quantity (*Stewart's Manual of Physiology*). So, while we are concerned mainly with Indol, Skatol gets implied with it.

4. Prof. M. Foster says that Indol is a supplementary product of pancreatic digestion, which, however, is not formed by the action of organised ferments, for when digestion is carried on artificially, in the presence of Thymol or Salicylic acid (substances that do not interfere with enzyme action but arrest growth of bacteria) or when digestion is carried on in the absence of atmospheric bacteria, Indol is not formed.

So we see in the formation of Indol, the importance attaches really to bacteria and not to Trypsin as Prof. Sahli's statements would seem to indicate. Moreover, it seems safe to believe that Indol-formation (both physiologically and pathologically) takes place in both the small and large intestines; and although the odoriferous bodies of stools are not Indol and Skatol, which, in pure state, are odourless, still they are intimately related to them (Prof. Landois Physiology translated by Brubaker and Behner) and the presence of faecal odour is, therefore, under natural circumstances, an indirect but safe testimony to the presence of Indol and we always meet with faecal odour in the contents of the small intestine.

Three factors are indispensable:—

1. Indol forming bacteria, *e.g.* Bacilli Coli and Bacilli Proteus.

2. Indol yielding proteins.

Prof. Hewlett terms it tryptophan nucleus. Red meat contains most of it, while milk the least.

3. Favourable circumstances facilitating decomposition.

The relation between indicanuria and purin bodies.

1. The larger the quantity of purin bodies present in food articles, the greater is the amount of Indican passed with the urine.

2. Indicanuria is generally accompanied by high specific gravity and hyperacidity of the urine.

Diseases in which indican is present in the urine.

1. Bowel complaints *e.g.* enteritis, diarrhoea, dysentery etc.

2. Insanity :

The writer has the opportunity of examining hundreds of insane persons of different types in the Refuge Hospital, Calcutta and concludes that 50 per cent gives reaction of indican in the urine.

3. Persons leading sedentary lives *e.g.* students, clerks etc.

4. Sinking suppurations and gangrene.

Tests of Indican.

1. Physiological Indicanuria :—

The quantity of Indican normally excreted has been estimated by different observers as varying from 4.4 to 20 mgms. (*Landois, Stirling, Hewlett and others*). This, at the utmost, produces barely a slight discolouration with the reagents.

2. Pathological Indicanuria :—

Add a powerful oxidizing agent to the urine which oxidizes it first into indigo red, and then into indigo-blue.

The various oxidizing agents are :—

1. Potassium permanganate.

2. Sol. of Potassium chlorate and pure Hcl.

$\frac{1}{2}$ per cent sol. of Pot. chlorate	} add	3.c.c. of Chloroform.
5.c.c. of urine.		5.c.c. of pure Hcl.

On pouring Hcl one notices a red colour which develops into violet and blue.

On shaking Chloroform takes various shades of blue according to the amount of indicanuria.

INDOLACETURIA.

Indolaceturia is due to the presence of indolacetic acid in the urine; indolacetic acid is formed through the action of bacteria on tryptophan.

The Physiologic and Pathologic Significance of Indolaceturia:—

Normally, it is promptly absorbed from the intestine and either burned in the body with the formation of products not at present known, or appropriated in some synthetic process. Any obstacle or delay in the absorption of tryptophan favours decomposition by intestinal bacteria. *B. coli* certainly, and *B. bifidus* probably, are able to form indolacetic acid from tryptophan. It is certain also that many bacterial symbolic combinations in the intestine are able to make indolacetic acid from tryptophan. It is noteworthy that indolacetic acid is liable to be absorbed as such when it has once been formed in the intestinal tract, and it is further noteworthy that this substance is relatively resistant to the ordinary biologic processes of oxidation.

As both indol and indolacetic acid are derived from tryptophan and from tryptophan only, it is plain that there must be a reciprocal relation between the formation of indolacetic acid and of indol. Thus if the indol production from tryptophan be large, the opportunity for the production of indolacetic acid will be less than would otherwise be the case, and, *vice versa*, if indolacetic acid be formed in large amount, there is less opportunity for the production of indol, since there is at the present time no evidence that indol is ever derived from indolacetic acid. Only when the tryptophan available is abundant in the intestine as the result of

delayed absorption can we expect to get both indol and indolacetic acid in abundance? Clinical experience is wholly in harmony with this view. When indolaceturia is most marked, indicanuria is not apt to reach the high grades of intensity sometimes observed when indolaceturia is absent. On the other hand, indicanuria of the most intense type is not apt to be associated with the highest degree of indolaceturia. (*Herter in Jour. Amer. Med. Asso. June 13, 1908*).

Diseases in which indolacetic acid is present in the urine :

1. Bowel complaints *e.g.* chronic enteritis, typhoid fever etc.
2. Diabetes (*Chundra*).
3. Pulmonary tuberculosis (*Rosin*).
4. Chlorosis. (*Garrod*).
5. Osteomalacia.
6. Nephritis.
7. Carcinoma.
8. Gastric ulcers.
9. Perityphilitis.
10. Jaundice.
11. Insanity. (about 20 per cent).

Three factors are indispensable.

- (1) Indol acetic acid forming bacteria *e.g.* *Bacilli Coli* certainly and *Bacilli bifidus* probably.
- (2) Indol acetic acid yielding proteins.
- (3) Delayed absorption of tryptophan.

Test of indolacetic acid in the urine : -

When the urine contains a moderate quantity of indolacetic acid—say 0.001 to 0.01 of 1 per cent—the addition of

an equal volume of concentrated hydrochloric acid and the careful addition of a few drops of a 0.2 per cent solution of potassium nitrite suffices to bring out the urorosein reaction in an unmistakable manner. *i.e.* an intense rose colour is developed.

Experimental study has shown that those urines which yield the typical indolacetic acid color reaction on the addition of concentrated hydrochloric acid contain traces of nitrites. These nitrites are formed through the action of nitrifying bacteria in the urine, possibly from the breakdown of urea, but more probably from the action of these bacteria on compounds of ammonia normally present in every urine. Since a mere trace of the nitrite is all that is necessary, in the presence of hydrochloric acid, to give rise to the rose-red or urorosein colour, it may happen that the urine is not greatly clouded by the presence of nitrifying bacteria.

Treatment of Indicanuria and Indolaceturia.

The physician should bear in mind.

1. Deficient secretion of free hydrochloric acid in the gastric juice is a potent cause of intestinal sepsis.
2. Activity of intestinal micro-organisms.
3. Decomposition product of the proteid (mostly from meat and least from milk).
4. Sluggish peristalsis affords time for absorption.
5. Degeneration of endothelial lining of the intestine, hence the first gate of resistance of this human castle against bacterial invasion is less fortified, the other gates are blood and liver.

Hence the rational prophylactic measures will be:—

1. Promote secretion of free hydrochloric acid by taking

soaked gram, bits of zinger and common salt early in the morning.

2. Germs of putrefaction become weak in acid medium : hence take plenty of lemon, orange, pomegranate etc.
3. Promote peristalsis by liver tonics and stimulants.
4. Take fat in the shape of butter or ghee to have a soothing action over intestinal epithelium. Chronic alcoholism and irritants favour degeneration.

Hygienic treatment :—

1. Drink a glass of luke warm water early in the morning to wash the stomach.
2. Mild exercise and massage are good.
3. Eat easily digested nourishing diet ; avoid meat and other purin bodies.

Medicinal treatment :—

1. Open bowels by saline draught and enema.

The writer recommends Sodii Sulphate because the sulphate in combination with Indol in the blood forms harmless indoxyl sulphate or indican.

2. Administer intestinal antiseptics.
3. A dose of dilute hydrochloric acid with nucis vomica and bitter.

Writer's favourite formula.

R	
Glycerine acid pepsin	5. i
Acid Hydrochloric (Dil)	m. x
Tinc. Nucis Vomica	m. v
Spt. Chloroform	m. x
Inf : Gentian Co.	ad. 3. i

Mft. for a dose Sig : one twice a day after meal.

CREATININURIA.

In a normal individual, the output of creatinin nitrogen is expressed in percentage of total urinary nitrogen to be 3.9 per cent.

Creatinin is a product of the internal structural metabolism of muscle, and has nothing to do with its contraction.

Prof. Spriggs formulates the law that there is a decrease of creatinin in proportion to the decrease of muscle bulk.

The creatinin output is diminished.

1. Progressive muscular dystrophy.
2. Spastic paraplegia.
3. Myasthenia gravis.
4. Primary myopathies.
5. Myotonia congenita.
6. Locomotor ataxia.

Creatine appears in starvation as an end product of metabolism but disappears on carbohydrate diet. Protein and fat have no power in this respect.

Prof. Folin's observations have suggested that the creatinin output in an individual is constant, independent of muscular exercise.

Prof. Shaffer believes that in pathological subjects the creatinin is usually low, although the creatinin coefficient (κ/λ per Kilo body weight) shows a direct parallelism with the muscular efficiency of the individual; and indicates, further-more, some special process of normal metabolism taking place largely, if not wholly, in the muscles.

HYDROTHERAPY.

Hydrotherapy has been used in all ages more or less as far back as the history of medicine extends. The simplicity of its application, its freedom from danger, and the good results achieved with it have brought to the method many supporters. It has been misused in many ways by those who have had little knowledge of physiology and have undertaken work that has often been injurious to many patients instead of helpful.

During the last fifty years, however, the rational use of water in various ways has been studied until at present it may be said to be a science. The extreme of everything is bad. Too cold bath gives shock to a shattered system while the use of hot water is exhausting to a weak patient. To make hydrotherapy a success we must use not only water, but combine with it various mechanical manipulations as well as proper diet.

In the intelligent use of hydrotherapy, the physician must understand the proper combination of the various temperatures of the bath or other hydrotherapeutic treatment in order to get results which will be favourable as well as comfortable to the patient. If the patient leaves the bath with a headache and a weak feeling something has been wrong in the administration of the treatment. Hot treatments alone, as a rule, produce this effect, while a hot treatment followed by cold, properly applied, will leave the patient feeling comfortable and also will avoid the weakened condition which often follows the administration of hot baths.

Physiological function of water.

Internally :—

Water only possibly gets through the stomach or the intestinal tract, by which means it comes into immediate contact with the digestive organs and is partly absorbed into the blood, of which it forms a constituent. It further stimulates the peristaltic action of the bowel, the more powerfully the lower its temperature; water at high temperatures is employed in spastic constipation on account of its anti-spasmodic action.

Externally :—

Water is applied therapeutically in all its three conditions and at the most various temperatures, most frequently as water, next in frequency in the form of vapour, and least frequently as snow and ice.

(1) Water stimulates the cutaneous nerves, the intensity of which is greater the lower the temperature of the water, the more extensive the surface of integument which has come into contact with the water, and the more acute the sensibility of the individual and of the particular locality. Water at high temperatures acts as a sedative.

(2) Both cold and warm water causes a contraction of the cutaneous blood-vessels which are succeeded by their dilatation. Under the influence of cold there is a more rapid accession of blood and an increased vascular pressure; the effect of warmth is to relax the blood-vessels and to lower the pressure. The pulse is at first accelerated in consequence of the reflex action of the cold water upon the heart; afterwards its irritation diminishes. On the respira-

tion, the application of cold water has a great influence. Through its action, there results reflexly, owing to excitation of the respiratory centre, superficial and slow breathing. With the increased production of carbonic acid the air-hunger increases proportionately, and with it the depth of the inspiration. Like cold water warm water also causes deeper and more frequent inspirations either by its application upon the whole body or upon portions of it. Upon the muscular system and the general metabolism, too, cold water acts as a stimulant.

The principles of hydrotherapy.—Thomas McCrae (*American Medical Association Journal* Nov. 5, 1910) discusses this subject under three heads: *Internal, local and general Hydrotherapy.*

The benefit of *internal hydrotherapy* is seen in the acute infections, in which the greatest danger lies in toxemia. In some of the lesser infections, such as tonsillitis, some forms of chronic arthritis apparently of toxic origin, and in some nervous diseases, the effects of the internal administration of water are marked. The absurdity of giving diuretic drugs without also giving water is admitted. One should consider the condition of the circulation and the kidneys, but, in general, these are more liable to be injured by toxins than by hydrotherapy. In typhoid fever or septicemia, for example, one should try to have the patients pass at least 3,000 c.c. or, better, 5,000 c.c. of urine every day. In pneumonia one could hardly reach such amounts: probably 2,000 c.c. would be as much as could be passed.

In certain diseases, like gout, arteriosclerosis, or chronic arthritis, one advises the free ingestion of water as a routine

measure, having regard always to the state of the circulation. Metabolism is probably helped and the excretion of toxins aided. The influence on the digestive tract should be kept in mind, however, as too much water might be injurious to an atonic stomach.

In local hydrotherapy the circulatory and nervous systems are especially involved and it is sometimes difficult to say which plays the more important part. There are several factors at work, the most important of which is the influence on the blood-flow; and the effect on osmosis, which is markedly altered in inflamed tissues. In some applications there is an important effect on deeper structures. The effect on local nervous influences is shown by the relief of pain, and it is possible that the sympathetic system is also involved.

General hydrotherapy is mainly employed by the use of baths, which are of value in both chronic and acute infections as well as in various nervous disorders. As in the local use of water, both the circulatory and the nervous systems are affected. The use of baths in fevers, and as relief for insomnia, is mentioned as well-recognized. Friction is a good adjunct to the bath as it stimulates the circulation.

Cold and heat Compared.

Cold Treatments :—may often be given with comparative comfort where the hot treatment has been given just before. The use of heat prepares the skin by deadening the sensation of the peripheral nerves to a certain extent, so that the cold is not unpleasant.

Experiment :—

If an attendant should rub the spine of a patient, or even a well person, with a piece of ice without applying heat before it would be decidedly unpleasant, but following a very hot fomentation, the ice may be applied with very little discomfort ; in fact, with a pleasant sensation.

We must note also the condition of the patient in order to know whether it will be safe to use cool or cold treatment. To apply cold to a patient who is chilly, or where the skin is cold and clammy, or where the patient is sweating from natural causes, may be decidedly injurious. Cold is one of the most valuable means of reducing temperature, either locally or throughout the body in nearly all of the ordinary fevers, but there are cases where in the midst of a high fever the patient may be chilly, and especially so if cold compresses are applied over a large surface of the body to reduce the temperature. In these cases the temperature may be reduced to a greater extent even than by cold by using a continuous hot sponge bath, sponging the entire body rapidly during a space of from thirty to fifty minutes. In this way we are often able to reduce the temperature two or three degrees during one treatment, and while the patient was chilly at the beginning of the treatment, we find the chilliness disappears and the patient drops off into a quiet sleep, and after a few hours a great improvement is noticed.

Cold may be used in many ways :—

1. *Cold bath*—The elaborate process in cold-bath treatment in enteric fever can hardly be carried out in a private family, and in desperate cases in which cold application to the head has not been able to bring down the temperature we should

adopt some other means, as by itself it is injurious. Cold bathing as a routine treatment can be carried out only in a hospital. One can easily see the danger attended with lifting the patient several times, and nervous and sensitive patients not infrequently are collapsed.

2. *Cold sponging*—Cold sponging is very good and ordinarily serves our purpose excellently well. The general rule should be to give a cold or tepid sponging whenever the temperature keeps up to 104° F., especially in the second stage of fever, with but slight morning remission. A cold or tepid sponging, if judiciously carried out, with a little toilet vinegar or eau de Cologne, will accomplish the desired effect at a less risk; besides, cold sponging, in addition to reducing temperature, has the advantage of exercising a sedative influence on the nervous system.

3. *Cold mitten friction*:—A piece of coarse cloth is made into a simple mitt which can be slipped over the hand, and this dipped into cold water varying from 60° F. down to ice water, and the patient rubbed vigorously with it. This is called the cold mitten friction, and is a most valuable tonic treatment in nearly all cases in weak patients. In weaker patients milder temperatures can be used, but almost all stand the water at quite a low temperature. This is found to be an excellent treatment as a tonic in cases of typhoid fever or in the later stages of eruptive fevers such as measles, and as a tonic treatment for all cases of digestive troubles, in surgical cases or in any case where the patient would ordinarily be given tonic remedies. The effect is to keep up the strength, and there are no bad results, so far as has been observed. In most cases the mitten friction is better given

following some hot treatment such as fomentations to the abdomen or spine, combined with a hot foot bath. When the patient is well warmed by the foot bath and fomentations he will stand the cold mitten friction much better than if it were given without the previous hot treatment.

4. *Continuous or repeated cold enema* :—This is very useful in cases of typhoid fever, as cold water, perhaps at 60° F., being introduced into the bowel is brought in almost direct contact with the diseased area, and thus while reducing the general temperature, has a special influence upon the inflamed glands in the small intestine; it also introduces a large amount of fluid into the system, as is indicated by the enormous quantities of urine often passed by these patients.

5. *Cold compress* :—This may be applied in any size or shape to any part of the body. It is especially valuable in the treatment of inflamed joints. It is usually given following the application of heat either as a spray or a hot pour, or fomentation, The cold compress may be kept up for hours in cases of inflammation of any kind; usually, however, the fomentation or some hot application should be used at intervals of from one to three hours. The importance of the hot applications is the prevention of the paralyzing effect which might be produced by the continuous use of very cold application. This would be especially true if in place of the compress an ice pack was used.

Hot applications.

(1) *Fomentation to abdomen*. Pain in the stomach or any of the abdominal viscera may be relieved by fomentation.

Dr. W. A. George M.D. remarks :—"In cases of appendi-

citis a very large fomentation applied over the abdomen with an ice pack under the fomentation immediately over the appendix, will give great relief, as the ice acts directly as a sedative and an anodyne, while the fomentation has a tendency to bring the blood to the surface at a distance from the appendix, and thus the combination of heat and cold in these cases gives great relief."

(2) The *hot blanket pack* applied to a smaller portion of the body like the legs, is a very valuable remedy in cases of rheumatism. It is also a valuable treatment in a case where sweating is desired, as in cases of suppression of the urine.

Dr. W. A. George M.D. further adds :—"In cases where the pack is indicated and yet where the heart is somewhat weak, it is well to use an ice pack over the heart under the blanket pack. By the proper combination of heat and cold in this way practically every case can be treated with comfort and the results are much more favorable than where the applications are not properly combined."

A tepid sponge bath at 85°F. is necessary for young infants suffering from fever.

As we have stated before, the proper combination of hot and cold treatments is the most important thing to be learned by those who would prescribe hydrotherapy in practice. It is also very necessary that the patient should be closely watched, and that the attendant should be one who will observe the effects of the treatments. If not, a treatment which otherwise would be very valuable may prove not only injurious but possibly fatal to the case.

One point that should always be remembered in all treatments by hydrotherapy is always to keep the head cold and the feet warm.

Dr. Bernhard Schiffer of Vienna classifies baths as follows:—High-bath, plunge-bath, half-bath, full-bath, rain-bath, hot-air bath, and carbonic-acid bath.

1. By a *high-bath* we mean a bath in which the patient is sitting immersed in water to above the shoulders. The temperature varies from 30° to 38°C., and the duration from five to forty minutes. The patient should rub himself gently and be rubbed by the attendant. It is well known that such a tepid bath has a considerable sedative and anodyne effect. It is employed in neurasthenia, hysteria, locomotor ataxy, and polyneuritis. In certain diseases of the skin it achieves excellent results through the diminution of the cutaneous irritation. It is also accompanied by good results in insomnia, if taken immediately before going to bed. In surgery, too, it is frequently employed to further the mobility of limbs and joints in systematic passive exercises (kineto-therapeutic baths of Leyden and Goldscheider).

(2) The *plunge-bath* is a bath at a temperature of from 15° to 22° C. and of the duration of one or two minutes. The water reaches to more than half the height of the bath, and the patient is instructed to rub himself vigorously whilst sitting in the water without being rubbed by the attendant. The plunge-bath may be regarded as an eminently stimulating procedure, and is to be recommended in the cases in which there is room for an improvement in the circulation, respiration, and metabolism, but *where a consi-*

derable loss of heat is not desirable. Cool plunge-baths have also been prescribed against sleeplessness, when the patient should be put to bed without being dried first and covered with a lot of blankets (after-evaporation). Barwinsky recommends this procedure in all infectious diseases, even in the algid stage of cholera.

(3) The *half-bath* is a procedure in which the quantity of water in the bath is such as to allow immersion of the pelvis and of the lower half of the body as far as the umbilicus. The patient's head should be well cooled and his chest moistened before he enters the bath; he must next lie in the water so as to be covered by it over his shoulders, and assume afterwards the sitting position, rubbing himself over his face, chest, trunk, arms and legs, whilst the attendant pours some of the water over him and rubs one part after another in the water. The temperature of the bath is next reduced by one or two degrees through the addition of cold water, so as to finish the bath with a brisk thermal stimulation, the patient being again sprinkled with water and rubbed. The patient, on leaving the bath, is dried thoroughly, and having dressed himself rapidly, is made to take the so-called "reaction-walking-exercise." It is clear that in the case of half-bath the greatest importance is attached to a good and quick reaction. It is, on the whole, an actively stimulating and refreshing general procedure.

As a dietetic remedy in affections of the stomach and of the intestines the half-bath is employed at a temperature of 28° or 30° C. and with a duration of from three to four minutes; only in atonic conditions of the abdomen one may use the modification with high abdominal affusions, in which

the attendant pours the water upon the abdomen of the patient from large buckets or from one to one and a half metres. In diseases of the nervous system we may recommend baths at higher temperatures, from 22° to $32^{\circ}\text{C}.$, but of longer duration, say, from four to six minutes. Both the temperature and the duration of the baths in these cases depend, of course, upon the consideration whether there are symptoms present of irritability or depression. In the former, one will apply warmer and longer baths, in the latter cooler baths of short duration.

(4) A *full-bath* is administered in a tank which is filled with water at a temperature of from 8° to $12^{\circ}\text{C}.$ and maintained at this temperature by a constant inflow and outflow of water. The patient dips down once or twice whilst making vigorous movements. This bath is indicated in conditions which demand increased elimination, especially in obesity, syphilis, gout, and chronic metallic intoxications.

(5) The *rain-bath*, or *douche*, is a procedure in which the water falls upon the body, either from a certain height in the form of a stream, or in the form of a shower or of rain-drops, or, lastly, in the form of vapour, the contact with the cutaneous surface or portions of it taking place at a greater or lesser pressure. The temperature varies between the lowest and the highest, and the pressure should represent from one to three atmospheres. Short, transient rain-baths cause a stimulation of the periphery and also of the deeper organs, with extraction of little heat; they are therefore indicated in catarrhal processes, general debility, and "hardening cures." Rain-baths of longer duration and lower temperatures extract more heat and are useful as cooling

procedures after perspiration. Rain-baths of medium temperature are indicated in conditions of irritability and in insomnia, on account of their sedative action; warm douches may be recommended to patients suffering from cramp-like seizures, from rheumatic and arthritic symptoms, and from the lightning pains of locomotor ataxy.

(6) *Hot-air and vapour baths* generated by specially constructed appliances have as their object the production of a vigorous outburst of perspiration, by which the body-weight is always diminished. They are eminently suitable for the treatment of obesity.

(7) *Partial baths are* -

(a) Occipital bath, in which the back of the head is immersed in a vessel from and into which water flows at its normal temperature. It is often employed in headaches due to anemia, in sexual irritability, in neurosis of the heart, and in nervous asthma.

(b) Hand-baths and foot-baths are well known for their beneficial influence.

(c) Elbow-baths, are especially useful in the early stages of whitlow on account of their anodyne and antiphlogistic effects.

(d) Sitz-bath, the action of which rests upon the reflex irritation of the deeper nerves and blood-vessels of the abdomen and pelvic cavity, is beneficial.

(8) The *carbonic-acid bath* is a tepid bath mixed with carbonic acid, imitating in its effect the baths of Nauheim.

Carbonic acid bath.

Nature has provided carbonic acid in numerous spas and, since the days of yore, natural carbonic acid or effervescent baths have been in vogue in a great many watering places of the old countries. Carbonic acid baths, inadequately termed Nauheim baths, are prepared artificially by dissolution of bicarbonate of soda and by addition to the water either of acid salt tablets, or of diluted acids of several kinds.

Drs. TH. AND FR. GROEDEL (*Monatsh. f. Phys. d. nat. Heilmethoden*, Jan. 1909) remark of the influence of CO_2 baths upon dilatation of the heart.

About thirty years ago, the two Schotts Nauheim pointed out the possibility of reducing dilatation of the heart by means of CO_2 baths. The effect of the bath is a stimulation of the muscle.

(9) Oxygen Bath.

To prepare this the tub is filled with water up to the patient's neck. Therein 300 grams (two-thirds of a pound) of sodium perborate are dissolved and one minute before the patient enters 15 grams (half an ounce) of manganese borate are added. This plays the role of a catalyser and causes the perborate to give off its oxygen. After the perborate has been added, the patient, having previously been rubbed with alcohol, enters the tub and undergoes gentle but thorough friction all over, under water.

The two salts are sold in the market in separate bags, packed in tins, and keep well for any length of time. The label gives the necessary details as to the technique of the procedure, which yields about 35 pints of nascent oxygen. The duration of the bath is 15 to 20 minutes.

As soon as the bather lies quiet, his skin is quickly covered by a glistening layer of finest oxygen bubbles which becomes closer every minute. Forming, driving up, bumping against the skin they cause a queer tickling and prickling sensation that is very agreeable. When we near our hand to the lower areas of the periphery, we feel a sensation somewhat resembling the touch of a greasy surface, similar, also to the crunching of snow, or the discharge of minute quantities of electricity. When we submerge the ears, we hear a constant, fine sizzling, caused by the bursting of millions of oxygen globules, the finest of which we are unable to see, though they give rise to a milky turbidity of the water.

It is a known fact that gas is a bad conductor of warmth, the terminals of the thermic nerves are surrounded by a medium perceptibly warmer than the water. This brings about a sensation of warmth, "As if the water had, all of a sudden, become warmer." This feeling stays as long as the bath lasts, so that patients often remark "they wished they could remain in it for hours" (Tournai). The warmth is conveyed to the central stations, and the bather feels the water warmer than it really is. Besides this action on the thermic nerves, other stimuli act upon the nervous elements within the skin, regulating the peripheral circulation. Whether these are of physical or of chemical nature, or both, is difficult to decide, but there is no doubt that a pronounced contraction of the cutaneous vessels takes place, causing a distinct paleness. Irregularity and weakness of pulse are markedly corrected. The respiration is acted upon in a similarly sedative way.

The oxygen bath *reduces abnormal augmentation of blood pressure, rate of pulse and respiration.*

An appreciable absorption of oxygen through the skin, is inadmissible (Winternitz). Zuelzer, Salomon and Schierbeck found that the perspiring and hyperemic skin may absorb up to four or five per cent of the pulmonary intake, but in the O_2 bath the skin is not hyperemic even if the amount were larger.

Oxygen is one of the most powerful disinfectants known.

In conclusion, we may outline the physiological action of the oxygen bath thus :—

- (1) It is a neutral bath.
- (2) It acts oxidizingly and disinfectingly upon the skin.
- (3) It has a powerfully suggestive influence.
- (4) It alters innervation
 - a. by discontinuation of paresthesias,
 - b. by its sleep promoting peculiarity and
 - c. by its generally sedative and indirectly stimulating action.
- (5) It is a circulatory revulsive, turning the blood from the skin toward the inner body, most probably, especially into the muscular areas, thus causing cutaneous anemia, peculiar lack of goose skin and chilliness.
- (6) It reduces an abnormally increased blood pressure, at the same time probably rendering the blood less viscid.—*Friedrich Gross* M.D.

CO₂ and O. bath (Compared).

1. The ingredients of the carbonic acid bath are of rather corrosive character and spoil the tubs badly, unless these are of wood.

2. Careless procedure may give rise to cauterization of the anus and genitals.

3. Inhalation of the supernatant carbon dioxide can give rise to the troublesome and possibly injurious symptoms.

4. In carbon-di-oxide bath the blood is driven toward the skin, thus powerfully depleting the inner organs.

1. The chemicals generating oxygen are absolutely harmless

2. This in the oxygen bath, is positively excluded.

3. Inhalation of the supernatant oxygen never can give rise to the troublesome and possibly injurious symptoms

4. In oxygen bath the skin certainly does not contain more blood or in other word the blood is chiefly turned toward the skeletal muscles (*winternitz' suggestion*).

Therapeutic Use of Oxygen bath.**1. Extensive burns :—**

Theoretically, nascent oxygen should be of paramount value in the treatment of extensive burns, when in a purulent state, as it not only fulfils the requirements of bacteria-hunting surgeons, but also acts favourably upon cutaneous hyperemia, with its attendant pain and loss of heat; nor should the valuable stimulation of the paralyzed nervous system be overlooked.

2. Contagious diseases *e.g.* scarlatina, measles, small pox or microbic skin diseases as psoriasis, favus, impetigo, certain forms of eczema and others.

3. Paresthesias of different origin. *e.g.* In the burning of hands and feet local O_2 bath is recommended.

4. Oxygen bath is of a decidedly sedative character and therefore it is a sovereign soporific agent which can be safely given in insomnia.

5. We know that the continuous full bath represents the most powerful sedative, that positively overcome even the extreme conditions of renal cirrhosis.

6. In asthma, dyspnoea, cyanosis of cardiac origin tachycardia and exophthalmic goitre, the oxygen bath affords rest to the out-balanced heart and at the same time stimulation. The nervous and dyspnoic restlessness abates and the sufferer is beatified with sleep. The whole circulation being stimulated and carrying a blood richer in oxygen, the troublesome and agonizing pressure upon the cerebrum is effectually reduced.

7. In arteriosclerosis it exerts its specific influence upon the increased blood pressure.

Oxygen bath is contra-indicated in conditions of low blood pressure no matter of what origin.

To sum up: Winternitz, the father of hydrotherapy, is right in stating that the oxygen bath forms a new link in the chain of procedures adapted to domesticate hydrotherapy. It is welcome as a substitute for other hydriatric applications, valuable as to innervation and O_2 ingestion and, above all, entirely new and without parallel as a peculiar circulatory revulsive.

THERMIC INFLUENCE UPON INFLAMMATION.**A. The influence of warmth upon inflammation.**

So far the general acceptance has been that warmth or heat causes an augmentation of the inflammation by increasing hyperemia and edema. This assumption is positively erroneous, as the inflammatory process is entirely altered as to its essential features, no matter whether the treatment is begun immediately after the lesion, or later.

I. The influence of Poultices or of Dry Compresses.

1. Wet warmth is administered by means of a poultice of 100° F. for 9 hours. The control (untreated) side presents the well known solid infiltration with leucocytes which become thinner the farther away it is from the point of lesion. The warmed side shows a diminution of the total number of leucocytes to one-fourth or one-fifth. In the immediate neighbourhood of the lesion there are none at all, but the infiltration begins further away, becoming distinctly thinner and gradually fading away. The leucocytes show in small numbers the stigmata of degeneration. The vessels are somewhat dilated, the arteries a little more than the veins. The supramuscular fibrous tissue is slightly oedematous, the epidermis almost unchanged.

2. Dry warmth (109-115°) is administered by means of a wet compress with an impermeable membrane over the skin. Phenomena altogether like those under 1. Dry heat yields better results than moist heat of the same temperature.

II. The influence of Hot Air upon Inflammation.

When administered for a short time only, the influence is

shown by distinct arterial hyperemia and serous imbibition of the superficial and deep tissue; infiltration is scarcely noticeable.

The influence of hot air is altogether less pronounced than after compresses.

General Conclusions :—

1. A repeated short application yields the same results like continuous application of warmth.

2. Dry or wet hot compresses are more effective than hot air, as in Bier's method.

3. The earlier the treatment is begun, the more satisfactory it is.

4. Arterial dilatation and accelerated circulation.

5. The lymph circulation and formation of oedema are materially increased.

6. The congregation of leucocytes (formation of pus) is prevented or removed.

7. Heated, the staphylococci are reduced in number. A spread by the augmented lymph circulation does not take place; all details point rather to the assumption that the lymph contains protective bodies (Buchner's alexines), and that the enormous decay of leucocytes must be looked at in the sense of autolysis.

B. The influence of cold.

It is a known fact that the influence of cold ceases immediately after its discontinuance. Under the ice bag the arteries in the superficial and deep layers appear nearly unchanged, only occasionally somewhat contracted. The veins

are widely dilated and gorged with blood corpuscles. leucocytes just around the walls of the veins, form continuous rows: the erythrocytes get outcrowded, the further from the vessel, the smaller the number of leucocytes in the tissue. An inflammatory infiltration, when developed, is not removed by cold.

C. The influence upon inflammation of wet Bandaging.

Priessnitz Compresses.

Upon the diseased region more or less thick layers of some flexible tissue are placed, which have been adapted in form and size and well wrung out of cold, not iced, water. They are well covered with dry material (wool, linen, flannel, but without impermeable membrane).

For daily practice we may, therefore, conclude that, in order to prevent or to treat local inflammatory processes and to avoid formation of pus as early as feasible, wet bandages without chemical additions, with an impermeable membrane, will yield the best result, especially when they remain moist and unchanged as long as possible.

D. The influence of alcohol bandages upon inflammation.

Upon the diseased area gauze layers soaked with alcohol are applied and covered with perforated bandage.

It is better to use a more highly concentrated alcohol for a short time than one of less percentage for a longer time.

Care has to be taken not so much for a frequent changing as always to keep the gauze well moistened.

Very soon after the administration, superficial and deep hyperemia sets in: sometimes the arteries are more dilated, sometimes the veins, and again both alike. The lymphatic imbibition is highly obvious and seems by no means dependent on the circulatory conditions of the blood vessels. Owing to the increased circulation in blood and lymph channels, leucocytic aggregation is positively impeded or, when existing, gradually but unmistakably reduced, even "in the presence of numerous colonies of highly virulent staphylococci." As to the degeneration of the leucocytes, as to the fact that germs are not carried away and as to a positive continuation of the effect after discontinuance of the bandages, the results are the very same as under hot poultices, only less pronounced. But as a peculiar feature of the alcohol bandages, a distinct serous imbibition of the nerve sheaths has to be mentioned, which probably tends to explain their well known pain-stilling action.

N. B. If the bandages are continued for some time, the epithelium is injured.

E. The influence of derivatives and irritants on inflammation.

Since the days of yore, physicians and laymen alike have believed that the so-called derivatives (rubefacients) caused a derivation of the blood stream from the (inflamed) depth toward the (irritated) skin and that thus the deeper seated inflammation was unburdened or decongested. But Billroth, Weirhsberg and recently especially Bier declared that only hyperemia could be in question.

Tincture of iodine badly injures the epithelium and the subjacent tissues, which are distinctly infiltrated by

leucocytes, decaying remarkably quick, and show considerable venous hyperemia and edema. The reaction never reaches deeper layers, even when the brushing is repeated in each and every trial; but that hyperemia and increased edema are the working factors. Hg. and Hg. carbolic acid plaster seem to injure the epithelium less intensely. The deeper tissue is only inconsiderably reached.

F. The influence of Bier's stagnation upon inflammation.

Details as before. Large and small veins are highly dilated, especially in the superficial regions. The arteries remain unchanged. When the stagnation is accentuated, hæmorrhages are likely to occur.

CLEANLINESS.

Sir Almroth Wright M.D., F.R.S., the distinguished Director of the Vaccine Department of St. Mary's Hospital, London, in an address given before the Civil Service Commission in London recently remarks that by washing, we take off a certain amount of microbes, but we also destroy the protective horny layer of the skin which is our main external protection against microbe invasion. "A great deal of washing increases the microbes of the skin," he declares, "so this distinguished *Savant* does not think cleanliness is to be recommended as an hygienic method."

The old adage "cleanliness is next to godliness" is quite correct, but even cleanliness may if carried to excess

have its disadvantages and excess becoming a vice may reap its own reward. It is well known that the healthy human skin secretes a certain amount of oily exudation and this is a product of the Divine Providence to protect the skin from the effects of changes in the atmosphere and decrease the severe influence of heat and cold from outside sources.

Experiment.

1 If a sheep be taken and the natural grease be washed out of its wool and the animal be exposed after drying it will probably die if left out at night in the cold. The natural oil having been removed from the wool and skin leaves the animal very susceptible to contract pneumonia.

2. After a hot bath there is always a danger of a chill, the natural grease having been removed, the conducting power being increased, chill is very likely to occur.

3. The Himalayan hill tribes (especially the females and children) anoint their cheeks with black soots to protect them from being chapped. They have learned so from experience.

4. From time immemorial it has been the habit of the Hindus to annoint their bodies with oil before a bath. By this procedure the natural condition of a protective layer of oil to the skin is restored and there is not a shadow of doubt that this custom is beneficial.

LACTIC-ACID FERMENTS.

The autointoxication resulting from undesirable ferments within the intestine is now believed to have a direct bearing on precocious senility, since the toxins resulting from undesirable intestinal fermentation so irritate the kidney and blood-vessels that function is impaired by producing fibrosis infiltration which leads to premature old age.

Most civilized races have abandoned the use of fermented milk foods on an extensive scale: however, Prof. Metchnikoff has brought the question of lactic ferments into prominence more especially in connection with his book on the "Nature of Man" and the "Prolongation of Life." The cry of "back to nature" is being seriously considered and scientific principles are utilized in furnishing the useful lactic ferments which have been recognized as the most useful in combating the growing tendency to degeneration of modern man.

A comparatively recent discovery has shown that in the large bowel of the middle-aged individual, where the food remains longer than in that of the child and young person, a certain alkaline putrefaction occurs which is injurious to health: and it is further known that the lactic acid bacillus found in soured milk gives rise to *Secretory* lactic acid and turns the putrefaction product into a healthy digestive ferment.

Most saprophytic, pathogenic and many useful bacteria, and even some protozoa flourish best in the alkaline culture-media, nevertheless quite a large number (two to three hundred varieties) gives rise to "*excremental*" lactic acid.

Most of bacteria are arrested in their proliferation very quickly by the lactic acid formed, just as yeast fermentation is arrested when "excremental" alcohol reaches a certain percentage. It is just this point which makes it necessary to use those pure cultures which are strongly acid and heat-resisting.

The Commercial Products.

These are known under the trade-names of . . .

- (1) Lactone.
- (2) Lactic bacilliary tablet (Fairchild)
- (3) Lacto-bacilline.
- (4) Fermentlactyl.

Theory of the action of Lactic-acid Bacillus.

Rosenthal and Chazarain have recently taken great pains to obtain scientific grounds for the lactic-ferment treatment of gastro-intestinal diseases. They cultivated, under the most severe conditions, various pathogenic microorganisms with lactic ferments.

These authorities found that it was impossible to cultivate these pathogenic bacteria in the presence of cultures of the bacillus bulgaricus (*streptobacillus lebenis*), and state that when these were cultivated together, in four days at the utmost the lactic ferments alone were found to be actively proliferating.

The writer takes the liberty of quoting the opinions of a few authorities regarding lactic acid ferment.

1. Dr. Grunbaum, emphasizes the advantage which the bacilli presents over antiseptic drugs and over lactic acid

given by the mouth, viz., that the bacilli form the lactic acid at the place where it is wanted. He instances the following :—

- (a) Diseases in which the micro-organisms, pathogenic to the mucous membrane, will not flourish in an acid medium, such as mucous colitis, cases of which often improve remarkably under this treatment, whereas gastric cases are, as a rule, little benefited.
- (b) Cases in which toxins produced by micro-organisms in the intestine are absorbed too freely, and he refers to several cases of impending uræmia and diabetes which have improved under this treatment.

2. Dr. Alexander Bryce, of Birmingham, describes soured milk as a complete food usually easy of digestion, in that 38 per cent. of its casein and 68 per cent. of its phosphates are rendered soluble by the process of fermentation. Moreover, it acts as a powerful diuretic, and occasionally as a convenient laxative, as well as a nerve tonic.

Contra-indication : —

- (a) Acid dyspepsia or hyperchlorhydria.
- (b) Rheumatism.
- (c) Severe colic.
- (d) Diarrhœa.

3. Professor Vaughan Harley sums up as follows :—

- (a) With regard to the influence of soured milk on intestinal putrefaction, the quantity of the aromatic sulphates is seen to be decreased. The increased indican also tends to disappear under treatment.

- (b) With regard to its influence on the absorption of food, he says that the quantity of nitrogen in the stools unquestionably increases on a soured-milk diet, but he points out that the nitrogen in the stools does not represent only the excess of nitrogen in the food, but also that contains in the various secretions eliminated into the bowel, together with that supplied by mucus, epithelial cells, and the bodies of bacteria, so that there is in all probability no real decrease in the absorption of nitrogen. On the whole, he thinks the evidence does not point to any increased absorption of food when soured milk is added to the diet.

4. Professor J. B. Bradbury, of Cambridge, relates cases in which the lactic acid treatment has proved beneficial, notably one of bradycardia and irregular pulse, in which the pulse rate rose from 34 to 60 or 70.

5. Dr. A. F. Hertz says he has met with severe cases of diarrhoea produced by soured milk. He regards lactic acid as a stimulant to the intestinal wall, and mentions numerous cases in which habitual constipation has yielded to the treatment. He has treated by these means cases of acute infection of the colon, and bacteriological examination shows the disappearance of the offending organisms from the stools.

6. Cases of melancholia get well under soured milk treatment.

FRESH AIR AND SUNSHINE.

Fresh air and sunshine are the worst foes to tuberculosis.

Edwin E. Graham (*Archives of Pediatrics*, February, 1909) speaks a word or two upon the remarkably good results which he obtained in the treatment of disease in young children by instituting measures providing for a goodly quantity of fresh air during a large part of the day and night.

During cold months in the Himalayas the babies who are protected by gloves, good warm stockings, veils over the face and warm clothing thrive remarkably well, and instead of seeing the infants die, the writer has seen them live.

Impress upon the mother the untold advantages of fresh air; Instill into her mind the idea that impure air is as bad for her child as is impure milk. Once gain her consent, the rest is easy. The physician must be enthusiastic. Rickets, tuberculosis, gastrointestinal disease, any and all conditions are benefited by this treatment. Everyone should be made to understand how important it is for the very young to be taught how to stand, lie down and sit properly, and that deep breathing is the proper and only sure way to secure full lung expansion. Let all join hands and preach fresh air. "Back to nature" said the great Rousseau and in a modified sense we physicians might give the same advice to our tubercular patients.

Heat and Light.

(*Sunshine*).

Light is simply vibratory waves striking the body like a supposed bombardment; it comes within the range of

physics, and we can dimly see how it might be of therapeutic value. The eye recognizes certain octaves which are approximately measured as vibrations from 500 to 700 billions per second.

In view of these limitations, one cannot deny the possibilities of vibrations and vibratory actions going on beyond this, acting on the body in a thousand different ways, antagonizing disease and encouraging health. The sun's rays falling on the body are followed by heat. This is simply the obstruction and transformation of the vibrations into another form of energy, or it may be transformed into electrical waves and the action and direction will change. This may be restorative, and under certain influence destructive. The most perfect growth and development depend on the action of the sun. Where this is absent, the defects are clearly evident.

Light applied in varied forms has an unknown power which is yet to be studied. Innumerable examples and confirmatory facts can be seen in every-day life and can be studied by the action of light on plants.

Cloudy, murky days exert a morbid, depressing influence upon the majority of individuals, while sunshine and fair weather are tonic and rejuvenating in their effects. Sick people are always worse on bad days, while neurotic and melancholic persons are always doubly introspective. It is true that pathogenic organisms are more prevalent on damp, gloomy days, and the state of the mucous membranes makes their lodgment an easier matter, although it is probable that the morbid mental condition prevailing at such times makes

infection all the more liable. The lowered resistance due to purely psychic causes is perhaps as strong a factor in inviting microbic action as any other.

It is well known how large is the significance of light in the development of all organisms. The skin especially is subject to this influence. The exposed skin surface is far more sensitive than the covered portion, and more so when it is diseased.

Experience has taught that cases of variola treated in semidarkness are much milder than when treated in full daylight. Where daylight is excluded and lamp or candle light substituted the formation of pimples and vesicles remains stationary, the skin never becomes inflamed and the pustules never suppurate. There never are heavy pains and even the itching is but very little. The earlier the room is darkened, the better the results.

The inhibitory power of sunlight upon the growth of tubercle bacilli was established some years ago and is too well known to admit of discussion. Its action upon tuberculosis of the lungs, joints, bones and glands, as well as upon bronchitis, asthma and many other diseases, is recognized and utilized.

The crowded city where the greatest need exists for radiant energy is just the place we can not obtain it. Here we find a good substitute in the electric light.

The utility of light and heat as a therapeutic agent is now so generally recognized by the medical profession all over the world that the better equipped hospitals and

infirmaries are provided with apparatus for administering this treatment.

Crothers of Hartford, has made many practical experiments with the radiant light bath in many conditions dependent upon toxemias. His conclusions are:—"It penetrates to the deeper tissues of the body and is turned into heat and so transformed into nerve energy more positively than administration of dry hot air."

"The clinical effects of the radiant light bath prove its power as an eliminating agent, and as a corrector of neurotic nutrient and capillary disturbances. Its physiological action depends upon the heat and chemical rays coming in contact with the substances that are resistant to their passage and thus transforming them into heat and light energy."

"The skin is a poor conductor of heat, but readily transmits light and radiant energy. Thus, in the deeper tissues, it becomes changed into heat."

"Radiant energy has two marked actions on the skin and tissues—one of stimulation and the other sedation."

"The stimulating action falls first on the sensory, then on the vasomotor and heat centres, and lastly on the secreting centres. The vasomotor centres, controlling the constriction and dilatation of the walls of the arteries, respond very quickly to surface changes."

"Light has a special action on the vasodilators of the arteries, stimulating increased activity and permitting the blood to flow more rapidly to the surface. This takes off the burden of the heart's action and relieves the constrictions to the arterial circulation and to the capillaries. Oxidation

is increased with an increase of elimination. There is a fall in arterial tension and a uniformity in the action of the heart and respiration."

The effects of this method of treatment on arterio-sclerosis are rational and beneficial. In albuminuria, Dr. Lebon has had many cases which were improved. Good results follow this treatment in rheumatism, arthritis, also in gout, asthma and neuralgic conditions.

Electric lamps that possess the actinic or chemical rays and the radiant heat rays,—which are powerfully stimulating and penetrating, produce dilatation of superficial blood vessels, relieving congestion of internal organs, affording an analgesic action which is most gratifying.

How beneficial, therefore, must be a method of treatment whereby the vessels are more fully dilated than is possible by any other method except that of radiant heat which penetrates beyond the surface. It is not heat alone which is so beneficial, it is the light rays as well which penetrate the tissues and stimulate the vasodilator nerves and relieve congested internal organs.—Herbert Pitcher, M. D.

The writer recommends his reader to be in the sun at least three times a day morning, noon and evening to have the full benefit of actinic rays.

An illustration of Fresh air and sunshine treatment.

A couple of years ago, on a fine spring morning, I was walking through a park to see a sick baby. Among the trees that lined the roadway I espied beautiful roses. As I stood feasting on my senses I wondered why these

flower-babies of Nature had no need for doctors or nurses, whereas human babies had!

I picked a few of the flowers and hurried to my patient. The little fellow was very feverish and delirious. He was panting rather than breathing, for he was dying of double pneumonia; he had been dying for some days, so the mother stated.

As I stood by the cradle side the mother pleaded, "O, doctor, can you save my boy?" I replied, "I think so, God helping." My reason for answering encouragingly was owing partly to self-reliance based on experience and partly because I had just witnessed and understood how *sunshine* and *balmy breezes* and *refreshing moisture* had coaxed roses from seeming death into healthy, beautiful blossoms.

Holding up the few roses I asked the lady if flowers would grow and develop without sunshine, and she said no. I asked her if sickly blossoms would revive without air and rain (or water) and she said no, and I asked her if roses would thrive in stuffy rooms and she said no. Then I asked, "How do you expect God or Nature to break all natural laws and perform a miracle just for your child when you keep him away from vitalizing light and air and water during the inclement months of the year? Your child's body has stored away as best it could the chemical impurities which you have compelled him to breathe and drink and eat during these many past months, and so do you wonder why Nature is now burning and ridding itself of the poisonous waste or rubbish, as you do at housecleaning time? For reasons that are obvious Nature has chosen the infant's lungs to build a bonfire in and reduce the body poisons to ashes.

Nature comes before you sometimes as a member of the city police, sometimes in the guise of an anxious wife : sometimes as a sweet mother, sometimes as a dear father.

The wise says :—

1. “The wisest, happiest of our kind are they
That ever walk content with Nature’s way.”—
Wordsworth.
2. “Nature is only conquered by obeying her.”—
Baron.

Colour Treatment.

1. White colour reflects almost all the rays of light, while black colour absorbs them. From this we learn one grand truth that during noon in summer it is advisable to wear white suit, while during winter the black.
2. Red is an excitant ; it excites the nervous system.
3. Orange and yellow excite to a much less degree.
4. Violet, indigo and blue have calming effect.
5. Blue light has a soothing and sedative action on the nervous system. Its anæsthetic property is not unknown to chromopathist, hence used in neuralgia. Blue colour acts favourably upon the nervous system. Flies dislike intensely the blue colour.
6. Green conveys tranquil joy.
7. Opal light is considered to be of benefit in curing tuberculosis.

MASSAGE.

Carl Sandzen enlightens us with the following suggestions.

The general impression, even among the medical profession, has been that massage requires neither experience nor knowledge, but purely physical strength. Anyone who uses this agent without knowledge of anatomy and physiology and proper diagnostic ability does just as much harm as an unskilled surgeon. None but a physician or masseur who is well prepared to use this powerful therapeutic measure should ever be allowed to manipulate the human body.

While massage has been in use for thousands of years by civilized and uncivilized people, it is but fifty years since its real value began to be understood by a few physicians in Sweden and Germany, and since that time it has steadily grown in recognition as a powerful curative agent.

Physiological Function.

The physical action of massage so far as known is first observed upon the *skin*. In a mechanical way it removes more or less the most superficial epidermis cells, and increases at the same time the permeability of the skin, the so-called *perspiratio insensibilis*. This action can be modified by the dosage of fat used in the manipulations. Pathological adhesions of the skin are loosened and products of a traumatic or inflammatory nature are through morphological changes made more easily absorbable.

If the hand be allowed to hang down at the side for a few moments it will be noticed that the visible veins are distended with blood. By light centripetal strokes of the palm the amount of blood in the vessels can be lessened until

there is a slight furrow instead of the previous elevation of the distended vein. By following the main and branches of the *vein* it can be emptied by negative pressure through suction. The same effect can be produced upon the *lymphatic vessels*. Massage is thus the most powerful means to remove catabolic substances stagnating in the lymphatics; in this way it stimulates nutrition. The fluid is driven centripetally, and the vessels are filled centrifugally. The rapidity of the blood current can thus be increased by massage. This has been proved by experiments. That is, by counting the red and white blood corpuscles before and after massage. This is explained by the pumping in of corpuscles from the smaller blood vessels into the larger. It has been proved that we lessen the activity of fluid in *serous cavities*, as the abdominal cavity, joints, etc., through massage, by means of interstitial absorption into the lymphatic ducts.

That massage has a very powerful influence upon the *muscles* can be proved by the following experiments: Have a man lift a weight of three pounds, for instance, up to his shoulder as many times as possible. When he becomes totally tired out, let him rest fifteen minutes, and then begin anew. During the second attempt there will be considerable decrease of power and endurance. He would not lift the weight nearly so many times as before. Massage his arm for five minutes, and he will be able to repeat his first performance.

It has no power of restoring dead tissue, and its power of removing exudates is accounted for by directly hastening the circulation through the veins and lymphatics.

of the part, and the indirect effect of this upon the arteries supplying the part and upon the rest of the body.

Mechanical irritation has some influence on *unstriated muscles*, wherefore we get good results in massage in cases of atony of the stomach, intestines and insufficient sphincters.

The influence of mechanical irritation on the *nerves* might be best expressed in the so-called Pfluger's law. "Weak irritation increases the irritability of the nerves; medium, benefits the same; strong, decreases, and very strong, stops the irritability."

It has a soothing effect, perhaps through stimulating afferent nerves.

Under the same law from the so-called vibratory massage the influence of massage of a small or greater part of the body is especially confined to *the general assimilation and blood pressure*. The increase of rapidity of the circulation, which stimulates the cells to energetic activity, favours a rapid assimilation, explains the increased secretion of urea during and after massage. Experiments have shown that such manipulation in the first place acts upon the skin, little friction, little kneading and little vibration increase the blood pressure. On the other hand, more powerful deep massage decreases the same. The possibility of increasing the heart action by massage movements, especially blows and shock, either over the site of the heart or the whole body, is now a recognized fact, even if there be some uncertainty about the way, that is, as to whether it is through reflex action upon the tenth nerve or through more direct action upon the heart itself.

The *temperature of the body* is increased on the surface and lowered in the rectum by massage of the limbs and back. Abdominal massage has the opposite effect. The mechanical action of massage and its effect upon *absorption and circulation* make it especially useful in affections of the arms and legs, in muscular atrophies, myocytes, rheumatic complications, subacute and chronic tendo-vaginitis, after treatment of skin lesions and X-ray burns to prevent disfigurement from contraction of scar tissue, neuritis, neuralgias, joint affections, as dislocations, after-treatment of synovitis, etc.

Therapeutic use :—

All internal diseases, functional disturbances of the stomach and intestines are benefited by massage ; especially is this true of colon inactivity, but even in atony of the stomach we get good results.

By its powerful increase of absorption, its mechanical action in breaking up adhesions and converting dislocations, massage has given good results in gynecology. Enuresis, due to insufficiency of the sphincter vesicle has lately been treated with great success by massage.

Classification.

1. Effleurage.
2. Friction.
3. Petrisage.
4. Tapotement.

Effleurage consists of centrifugal strokes of varying strength over a comparatively large surface, usually with one hand. It is the form of massage most frequently employed. Its purpose is to increase the rapidity of the current

in the blood and lymph cells. It is, therefore, mostly used on those parts of the body rich in these vessels, for instances, the neck and extremities.

Frictions, as the name implies, are strokes with the hand in circles over small surfaces, one at a time, under more or less pressure; employed in hastening the regressive metamorphoses in exudations and infiltrations of the inflammatory products of the lymph vessels. The amount of pressure is the most important feature, and tests the operator's knowledge and skill.

Petrisage is a movement in which the operator seizes the part of the tissues to be worked upon between the thumb and fingers of one or both hands, and then kneads or pinches them thoroughly. In operating on large masses of muscles, *e. g.*, the arm or leg, a hand can be placed on either side, and the muscles kneaded. The action of *petrisage* is about the same as from frictions, at the same time partakes of that of the *tapotement*. Mechanical irritation to the muscles which contract from a kneading or pinching, just as from a blow on the affected place.

Tapotement consists of a series of manipulations more or less in the nature of a blow. The muscles are most influenced by blows across the long axis. The movement is given usually with the ulner side of the hand for the muscles, with the flat hand for the skin and nerves. On nerve trunks we usually give *tapotement* with the finger ends in percussion. Under *tapotement* is classified vibratory massage which, at present, is a valuable addition to the physician's armamentarium.

EXERCISE.

A healthy individual may indulge in any kind of exercise he likes best, *e. g.* dumbelling, gymnastic, exercise after Sandow's method, walking, bicycling, riding, boating, racing, etc., but for the debilitated and the aged gentle walking and descending exercise are best.

One may ask the question "can it be a sound, healthful policy to rise early and indulge in vigorous exercise before a square meal has been eaten?" Taking the question, exactly to the words used therein, it can safely be answered in the negative. It is a perfectly *sound* and *healthful* policy to rise and to retire to bed early. To indulge in *vigorous* exercise before a *square* meal has been taken is neither a sound nor healthful policy. The exercise to be indulged in India should never be *rigorous* whatever time it be taken. The early morning on the plains being the coolest and most convenient time for most people to take exercise it should be taken then, but in moderation to the individual. Vigorous exercise—*i. e.*, vigorous to the individual—causes fatigue, and as many of these people have to attend offices and other work during the day no good can come of it. Exercise to the point of fatigue results in an auto-intoxication, increases disintegration of albumen, and lessens assimilation. To crown all, frequently we find that such people not only get up early and take more exercise than is good for them but they also stay up late, the result being that when disease overtakes them they have little stamina to fight against it and either die very soon or get a severe attack leading to invaliding home. Exercise is good for all but must be taken in moderation to the individual. Sitting

in a gharry is not exercise, and if much indulged in will tend to obesity *cæteris paribus*. Early rising is not a necessity to enjoy in this country—of much more importance is sleep. Sufficient sleep is a necessity, and if one has a fair amount of exercise and has to keep up late at night then that individual requires to get up a little later. To burn the candle at both ends is neither sound nor healthful. Each individual requires a given amount of sleep according to his constitution, custom, work, exercise, etc. It would be a better policy to start business earlier and get off earlier or to have a few hours of lull at midday than a continuous rush all day.

Heinrich Stern (*New York State Journal of Medicine*, June, 1909) states that descending hills or stairways, in contradistinction to climbing the same, has been recommended by him as a valuable therapeutic adjuvant in "the treatment of obesity."

Dr. Stern designates as "descension therapy" an auxiliary remedial measure consisting in the application of definite and graded exercise of descending hills or stairways. The therapeutic descension exercises are primarily devised for the treatment of non-inflammatory abdominal disturbances and metabolic disorders, and also for certain forms of cardiac disease.

Descension therapy exerts a beneficial influence upon all the functional and some organic diseases of the alimentary tract and all the metabolic perturbations, especially if there be an accompanying affection of the heart or lungs, and a variety of other derangements.

By employing the stairways of elevator buildings, descension therapy is easy of execution.

The *technic* of descending exercise can best be carried out by descending a hill where you get the benefit of fresh air and you bring into play the entire musculature of abdomen, back and lower extremities. This is, however, an expedient of a privileged few. Not everyone has a hill in his back yard; secondly, but few can take a perpetual vacation and move from hillside to hillside in accordance with the season, and thirdly, not everybody can afford a vehicle, which brings him to the top of the hill, and an attendant, who accompanies him down into the valley. As a substitute for the same, Dr. Stern proposes the descension of stairways, an exercise almost analogous to hill descension in which, however, not all the muscle groups of the lower extremities participate as uniformly as in hill descension and which, although it may be executed in well-ventilated staircases, can not be taken in the open air.

An elevator to carry up the patient is the only necessary implement. The rectangular stairway with its numerous landings is well adapted for the exercise. Of course, flights of steps especially constructed for graded descension therapy, exposed to the air on at least three sides and situated near an elevator, will answer the purpose still better. Such therapeutic stairways, which are to be found in many sanitariums and institutes for convalescents, need not exceed two or three storeys in height, thirty-six feet in width and about sixty feet in depth. A therapeutic stairway thirty-six feet in width should be divided into six sections, each six feet wide and extending from the uppermost landing to the bottom. The first section should contain an incline and no steps at all. The grade of the incline should be

changeable, so that the inclined surface may represent either a steep or sloping hill. The second section should consist of a stairway in which the riser of each step is about two and a half or three inches high, while the tread is eighteen deep. The fourth section should consist of a stairway with eight inch risers and twenty inch tread; the fifth section of a stairway with ten inch risers and eighteen inch tread, and the sixth section of a stairway with steps irregular in height and depth.

The technic of descending exercise, which Stern pursues without the assistance of a therapeutic stairway, is very simple. The patient is carried by the elevator to an upper story of a high building. For the first week he is ordered to slowly descend the stairs with relaxed abdomen, two or three flights at the start if the case be one of great exhaustion, or five to ten storeys if the case be one of uncomplicated obesity, or functional abdominal disturbance. The exercise is performed from one to four times daily, as the case may be. From week to week the exercise is extended. The amount of descending which certain obese patients may perform is practically unlimited. Repeatedly ascending by means of the elevator, they may descend forty, fifty and more storeys on a single occasion. If the patient's general state of health permits, and in many instances of abdominal lethargy, it is essential and very well borne, the exercise is modified during the subsequent weeks in that the patient descends from step to step in a jumping manner, which enhances the jolting of the abdominal muscles and viscera. Another mode of increasing the efficiency of descension treatment, is to step on the heel and to bend the knees when

descending. The speed of the descending movements may be increased in the ratio in which the patient gains strength, steadiness and endurance. Descension should always be practiced for protracted periods. Naturally, numerous modifications of and additions to these simple exercises will be devised in course of time, especially if the therapeutic stairway should become a sanitarium feature.

ANIMAL MAGNETISM.

Some persons are more magnetic than others. Now, let us inquire, what is Human Magnetism and what makes one magnetic? Human magnetism, or nerve force, is a subtle, invisible fluid thrown off by the nervous system. It is of different kinds; some are magnetic to one person and not to another; no one can be magnetic to everyone else, but you may develop such a wonderful amount of Personal Magnetism that you can be magnetic to ninety or ninety-five per cent. of the people with whom you come in contact.

This Nerve Fluid (magnetic fluid) is under the control of the will-power, and the more you exercise your will, with this purpose in view, the more magnetic you will become, and the more people you will be able to influence. You must, however, be willing to practice and persevere. Do not expect to become magnetic in a single day. Rome was built not in a day.

Have this auto-suggestion :—

1. "MY WILL-POWER IS STRONG; NO ONE CAN RESIST MY INFLUENCE."

2. "I AM A SUCCESS ; I SHALL SUCCEED ; I MUST SUCCEED ;
NOTHING SHALL KEEP ME FROM SUCCEEDING."

The most important acquisition in the world is Personal Magnetism. This is worth more to you than anything else. It gives you power over people ; it gives you influence ; it brings happiness ; it brings health and wealth. You know these things just as well as we do. Then, if you realize the great importance of a magnetic personality, are you not willing to persevere until you attain it ? You positively can become magnetic ; you can develop a wonderful force of character. You know in making money it is the general opinion of the ablest financiers that the first few hundred or few thousand rupees are the most difficult to accumulate ; after that it is easier. The same is true of Personal Magnetism. After you once get started ; after you begin to develop your will power, and to develop magnetism, you will have no trouble ; you will get along very much faster than you now anticipate.

The basis of Personal Magnetism, or personal influence, is a good strong will-power.

Determine each day to have a strong will-power ; determine to control others by your will ; determine to control yourself. Make your will master of the other faculties. This will demonstrate its strength. Think of this several times a day, and especially, think of it before retiring at night. Determine to be successful.

There is a subtle, invisible influence that goes out from a strong, firm will which moves and controls people more than all words ever spoken. Surely its possessor may be said

have an invincible power. The very moment you come in contact with a person having such a power, you cannot help feeling it. There is no reason why you may not possess this power. You have the proper mental faculties, all that remains is to develop them. Do not expect to accomplish this in a day or a week, but persevere.

If you had never used your right arm, it would hang helpless by your side. Would you expect to develop this arm in a day or a week or a month?

If you would be successful in Personal Magnetism, you must have absolute confidence in yourself. By this we do not mean that you must be egotistical. Those achieve the greatest success who are modest in manner, calm, cool and self-possessed and of unlimited confidence.

Magnetic Healing is chiefly accomplished through the agency of breath, passes and massage.

1. **Breath.**—The breath is of great assistance in the treatment of disease. With it you can produce a heat which has a wonderfully soothing effect upon pain. Fold a handkerchief so as to produce four sheets of cloth, place the handkerchief over the seat of the pain and force the warm breath through it. Warm breath is produced by placing the mouth in position to say, "Oh!" You may take a long breath, place your mouth on the handkerchief and exhale slowly, but with sufficient force to drive the heat through the handkerchief into that portion of the body where the patient suffers pain; or perhaps a better way is to place the mouth against the handkerchief and inhale through the nose and exhale through the mouth for three or four times. Place a handkerchief upon your own arm

and practice this upon yourself until you get the knack. In treating toothache or neuralgia of the face you should blow the hot breath into the ear through the handkerchief. When there is irritation of eye due to some foreign body, hot breath affords ready relief after its removal—a fact familiar to all.

2. **Passes.**—In giving Magnetic Treatments, downward passes should be made from the seat of pain, and as you bring your hands off shake them as though you were trying to throw off molasses or some sticky substance from your fingers. Passes are made lightly and slowly. Always wash your hands in cold water immediately after giving treatments. There is no means of telling just how long it will take to cure any particular disease. In many cases a cure will be effected immediately, and you will be astonished at your own results. Persons who have been given up to die, are often restored to perfect health in a very few minutes by the hands of the Magnetic Healer. In some cases it may take months to effect a complete cure, but never give up, you will often cure when you least expect it. When one suffers from inflammation of the gum, the ideal treatment is to rub the gum gently with some tooth paste to have the full benefit of personal magnetism that is streaming off from the peripheral extremities of the body (fingers, hairs etc) : hence if you wish to strengthen your gum, the writer recommends tooth powder or tooth paste to be used by tips of fingers and not by brushes, and to be rubbed gently but persistently.

3. **Massage.**

TERRESTRIAL MAGNETISM.

If we throw a glance over the history of the human race we shall see that there have been distinct periods when man has advanced one step further in the conquest of the world.

Man had robbed the heavens of their secrets, but his ambition was not satisfied; he wanted to conquer the elements. Galvani, Volta, Faraday, Franklin and many others showed us what electricity is, what wonders can be performed through its agency: he wanted also to conquer water and space. Then the steamboat, the locomotive, made their appearance.

Being tired of travelling on earth, man said to himself: "I envy the birds in the air; they fly in the atmosphere nothing stops them; what pleasure it must be." And, indeed, out of his inventive mind sprang the airship. Nothing but death shall put a barrier to progress of science, for death, as we all know, is unconquerable by man. There lies a gulf "unknown and unknowable" to man.

All these have been great conquests, but what about medicine? Has it escaped the attention of man? Oh, no. From times immemorial men practiced the divine art of healing; they studied the plants and their medicinal virtues; they endeavoured to impart by their teachings a greater vigour to the body.

Magnetism is a mysterious fluid that pervades all nature, and imparts constantly a new activity to all that liveth.

Nature has already unfolded many of her secrets, and she is ready to unfold to us many more, if we are willing to search for them.

Material life is nothing else than molecular activity under the influence of that imponderable ethereal fluid.

If we study the composition of the human body, we will find that the medium in which we live is of two kinds; the cosmic medium or external, and the internal medium or structural, physiological.

By medium is meant all the circumstances which environ the living being, and in which he finds the conditions proper to his development, to the maintenance and manifestation of the life which animates that being. The internal medium has been thoroughly studied. Histologists, biologists, physiologists and pathologists bury themselves in the study of the most intimate parts of the human body and reveal to us the mysteries of the creation of man.

If we want to derive more benefit from our efforts to cure diseases we must return to the laws of nature; to that force which ancient writers called "*vis medicatrix naturæ*," the healing force of nature, which is really imbedded in the magnetic forces of the world; for after all, we must never forget that we are the helpers, the servants of nature; "*Medicus naturæ minister, non magister est.*"

There is nothing new, for Reichenbach declared, over fifty years ago, that the relations which exist between the magnetic fluid and the body are more intimate than we are aware of. Claude Bernard, the greatest physiologist of modern times, has taught that the phenomena which go on in organic bodies are subject to the same laws of the same physics, chemistry, and mechanics which govern all the other phenomena of organic bodies.

What is, that agent which keeps the body in a well-balanced equilibrium, which we call health ? it is magnetism, heat, light and electricity which are really forms of the same energy and that energy or dynamy is nothing else but magnetism, which manifests itself by the waves of heat, light and sound.

The electrical current always follows the line of the least resistance, while the magnetic waves flow in every direction, do not produce any disturbance, are not restrained in their course, nor limited in space.

Now you ask me : " Does terrestrial magnetism act on the body ? How is that action established ? Everything that liveth is under its control ; we human beings are submitted to it ; every atom, every cell of our body is influenced by that energy, as far as the material existence of our body is concerned. But in order that the body be subject to the laws of magnetism, or dynamics of the earth, we must find in the cell a certain affinity or attraction for it.

Indeed, if we look into the chemical elements that constitute the cell, we find that it is made up of elements which have an attraction for the magnetic fluid. It is very likely to that multiplicity of constitutive elements that we must attribute the power magneto-electric of the cell, a property which is especially found in the red globules of the blood and of the nervous cells. We must also add that the blood globule swims in an albuminous alkaline medium which is a good conductor of the magneto-electric fluid. Water is the most abundant of the elements that constitute the cell, being about four-fifths, which condition is a strong factor for the vitality of the globule. It acts as a general solvent and

favours the chemical changes which are essential to the absorption and assimilation of food, and the elimination of waste products.

We may rightly say that each globule or cell has an attraction for that magnetic fluid, and in that respect forms a complete electric circuit. All the cells through the magneto-electric current are put in communication and help each other in the performance of their work.

That magnetic force is principally stored up in the iron of the globule of the blood and constantly flows in the body with the blood. Besides iron, the hæmoglobin of the blood holds a certain amount of oxygen, which, according to Becquerel, is the most strongly magnetic of all gases. Physies teach us that when iron is magnetized it has a greater coercive force and a greater attraction for oxygen. In that manner we can easily arrive at the conclusion that, with a greater oxygenation of the blood, we will obtain a greater oxidation, and there will be less danger of having the xanthin products accumulating in the body.

The magnetic waves flow, so to speak, with the waves of the blood ; for the blood being an alkaline medium, is a comparatively good conductor. For that reason, the magneto-electric fluid is distributed more uniformly, more rhythmically through the body than the currents of galvanism and faradism, which have really one attribute, that of current strengths, current shocks, and act as irritants to the brain.

We do not pour electricity into the body ; it has the power to generate it ; it is inherent to its physical and chemical make-up ; and that power is centralized principally in the iron and the oxygen circulating in the blood.

According to Ampère's theory of magnetism, we may say that each molecule of the blood is traversed by a closed electric current. As the coercive force of these molecules is little, they occupy any position in which they happen to be; when the iron, which the globules of the blood holds, has lost a part of its magnetism, those molecular currents, on account of their mutual attraction, occupy such a position that the action of the blood on the tissues of the body is nearly *nil*. The flow of blood is not so active and becomes more or less stagnant, which condition is favorable to disease. But by magnetization, the molecular current of the blood takes a parallel direction, and the stronger the magnetizing force the more perfect the parallelism. In that manner the circulation becomes freer and more active; the stasis, when it exists, is overcome more easily, and the cure of diseases better effected.

Electro-magnets have an influence on the liquids of the body, especially the blood.

The magnetic fluid circulating in an alkaline medium such as the blood, increases also its electrolytic power, which is called "dynamical electricity." In that manner elimination, by the breaking up of compounds due to diseased conditions of tissues in sickness, takes place in a more effective manner.

Heart's action is increased and strengthened. Ordinarily the pulse under the influence of the magnetic waves gains a few beats, and at the same time becomes fuller. Owing to that increase of frequency and power in the heart's beats, we have observed a profuse perspiration in some patients taking the magnetic treatment. This phenomenon is in all

probability due to the disengagement of electric currents resulting from the oxidation taking place, and from increased circulation in the capillaries. With that perspiration, patients experience a sensation of heat which is quite different from the heat of fever. That increase in temperature is only temporary until the potential energy of the body has returned to its normal. That phenomenon of heat which takes place in the body, when under magnetic influences, is very likely of the same nature as when the metal wire through which an electric current passes becomes heated. In like manner the cells of the body acquire a higher degree of temperature and of activity with the result of higher degree of oxidation. It produces a certain amount of hyperemia which increases the absorbent power of the blood and its nutritive and regenerative properties; for it is through the blood that the regeneration of tissues takes place. This hyperemia also produces a soothing effect on the body by increasing the flow of blood to the nerves and consequently a more nutritious pabulum; for we are told that "pain is the cry of a nerve for food."

This activity in the circulation and in the process of oxidation has led us to try the magnetic treatment in rheumatic conditions and kidney disturbances. The result has been very gratifying. By repeated urinary analysis, we have found the phosphates and the urates diminish in quantity; we have seen albumen disappear; even the peristaltic action of the intestines was increased so that patients who suffered from intestinal auto-intoxication from retained feces would defecate freely every day, without having recourse to either cathartics or laxatives. This goes to show

that in gout, as well as in rheumatism and kidney troubles, there is a lack of proper circulation, there is a deficiency in the oxidation of the xanthin products (urates).

The greater the magnetization, the greater the attraction of the cells for one another, more harmonious is their work in concurring to obtain a perfect health. They can resist with more power the invasion made by the germs of disease.

We know that nervous cells live, nourish themselves and liberate products of waste through the blood. These acts of nutrition produce in the nerves, manifestations of forces which show themselves, by electrical currents which are very evident at the periphery of the nerves. Through the constant passage of magnetic waves in the body, more electrical currents will manifest themselves by the greater activity of the nervous centres, increasing the supply of blood through the vasomotor centre and bringing better nourishment to the different viscera of the body through the trophic centres.

Of all the drugs, of all the methods, of all the appliances used to treat diseases, there is none that corresponds better to the necessities of the human body than the magnetism or dynamy of the earth. It is a treatment that is, so to speak, inherent to our own nature, for we owing to the complexity of the elements that form the composition of our body, are subject to the influences of the magnetic section of the earth.

Therefore, a remedy that shall act in a more direct manner on all the different organs of the body will be the ideal remedy, the one which we should also have in our mind. That remedy also must not be toxic, that is to say, produce contrary effects to those it is intended for.

In therapeutics any agent used as a remedy must not only act as a chemical agent but also as a physical agent because, as it has been declared by Claude Bernard, "all phenomena going on in living bodies are physico-chemical phenomena." Therefore, if we bring our attention to the influences which the dynamy, or magnetism of the earth, exerts over all the bodies, organic and inorganic, we shall discover that they are of purely physico-chemical character and preside over trophic centres, heat centres, sensation centres, motor centres, and circulation centres. There is not in medicine any drug which has such a varied and far-reaching influence over the organs of the living body.

PSYCHOLOGY.

Psychology means, briefly, the science of mind ; a knowledge of the power within ; and the application of this science to the physical ills of the body is known as hypnotic treatment, suggestive therapeutics, mental healing, Christian Science, faith cure, and the like.

The value of psychology to the world at large lies in its power to ameliorate conditions of disease. It is well to recognize that there are powers in the mind of man which will make the healthy man more healthy, but the point which will appeal most forcibly to a sufferer and an invalid is, that by the use of psychology we bring into play an active positive force, which will make the sick body well by restoring the normal or natural conditions.

Now, the natural condition of man is health, and without

touching here upon the mixed question of heredity and hereditary influences, it may be broadly stated that the old saying, "As a man thinketh in his heart, so is he," is being constantly proven true. If a man believes himself to be sick, he will, by his own thought, produce in himself physical changes corresponding to the nature of the disease he believes himself to be suffering from.

The human body has a framework, the skeleton, for support; on this are muscles to move it, vessels to carry nourishment to and waste away from the tissues, special organs to carry on special physiological work. The nervous system carries messages about the body. The two parts are distinctly separated in function, the voluntary part we can control (cerebro-spinal), and the involuntary part we can not control (sympathetic). Then the central executive part is the brain, and the "department heads" the cord and other centres.

The sympathetic, which, thanks to Byron Robinson, we are beginning better to understand, controls all the vital, vegetative processes of the body, governs all those acts which must be performed for life to continue, digestion, respiration, circulation, secretion, excretion, waste and repair. It is beyond our voluntary control. If not interfered with it does its work perfectly, and it will adjust itself to much abuse. It never makes mistakes if left alone, but its very unassuming nature can work mischief if interfered with. A great proportion of our therapy is directed to restoring the sympathetic to normal action, usually unknowingly.

Now, the brain is the organ of the mind. Most psychologists today think of the brain as an organ for transmitting

thought, not secreting, as the liver secretes bile, or combining, but transmitting it as a lens transmits light. The individual's character, mental ability, his individuality, depends on the character of his brain, just as any optical instrument is clear or cloudy, white or colored, as its object lens is clear or cloudy, white or colored.

The treatment of disease by psychological processes may be summarized thus :

Thoughts are things ; change the thought and benefit will ensue.

Mind of man is powerful enough, when properly directed, to control certain forms of disease. In other words, those who are healed are healed by the power of their own minds, suddenly aroused into activity.

Faith worketh marvels truly, but faith alone is not sufficient for all things in this materialistic age. In face of the fact that some are healed by faith and some are not, theory falls to the ground, and we must deal with the facts as we find them. In these cures by faith there is no evidence of the transmission of divine power from the relic or agent to the sufferer. There is no evidence of a miracle.

A miracle is something supernatural, something beyond the pale of natural law. Do we know of any example in which the laws of nature are arbitrarily thrust aside ? Are not the miracles which Christ performed through sheer strong will force, being repeated daily before our eyes ? Nay, most convincing of all, did not the great Healer Himself demand that in those He healed the condition of faith, or expectancy of relief should be present ? How often do

we find that quality "faith" the condition, the essential condition, upon which the wonder depended. Thus we read, to quote a few examples: "Thy faith hath saved thee." "According to thy faith be it unto thee." "O thou of little faith." "And he did not many miracles there because of their unbelief." It would seem, then, that the condition of mind of the sufferer is a very potent factor in establishing or removing a disease. In carefully diagnosing the cases treated by miracle workers, meta-physicians and mental healers of all kinds, we come upon two important facts. First, they can and do cure similar ailments in different people by entirely different, modes of treatment. Secondly, they do not perform a cure until the mind of the patient is brought by prayer, communion, thought or reading into a condition of hope and expectancy. There are no benefits derived until a feeling of hope, merging into the conviction of faith, has been established. The line of thought has been changed, and thoughts are things. We know, also that many of these cases which derive no benefit from the metaphysical line of treatment are quickly and permanently cured by the medicines of a practising physician. Is there a reason for this too? Is the virtue in the drug? Sometimes, yes; or here, again, as in the case of the worshipper at the shrine, the virtue may be in the patient. He cured himself by the agency of drugs, because drugs were in his case the strongest suggestion that his mind could grasp of benefit to follow. It must be remembered that medicine will often prop up a wavering faith, and support a weak belief through a trying ordeal, and it is in this sense that it is spoken of as "a strong suggestion."

In treating one who has been a victim of a morphine

habit the physician gives his patient a hypodermic injection of pure water into his arm. Now observe the force of suggestion. The patient, is convinced that his suffering will cease and that he will be compelled to sleep. His mind, then, fortified by suggestion, asserts its power over the body. It is his mind that calms his nerves, and soothes his brain; it is his mind that sends him to sleep.

Psychology deals directly with the mind. There is no muscle or nerve in the human body which cannot be brought under the absolute control of the mind. Physicians have given their attention to the body and have neglected to cultivate the natural force of recuperation and resistance, which is inherent in every man. Metaphysicians have gone to the other extreme and have despised the weakness of the body, refusing to sanction the use of necessary medicines. The wise man is he who bends all things to his service in the evolution of good.

A striking instance of this influence of the mind on the body is given in *Godwin's "Life of Victor Emmanuel."* "When cholera was raging in Naples, and the panic-stricken inhabitants were migrating by thousands from the city, the king went the rounds of the hospitals. He stood beside the sick beds, and spoke encouragingly to the patients. Before one of those already marked for death, the king stopped, and taking his damp, cold hand, he pressed it, saying, 'Take courage, poor man, and try to recover soon.' The warm grasp of the hand, the strong cheerful words, the recognition of the king's face, had an agitating effect on the man. That evening the syndic visited the king and said: 'Your Majesty's coming is a joyful omen. I am happy to tell you

that the doctors report a diminution of the disease in the course of the day, and your Majesty has unawares worked a miracle. The man you saw this morning, stretched for death, is out of danger this evening. The doctors say the excitement of your presence caused the salutary crisis.' ”

PSYCHOTHERAPY.

HENRY H. GODDARD, in the tenth volume of the *American Journal of Psychology* says :- “In spite of the severe criticism we have made of the reports of cure, there still remains a vast amount of material showing a powerful influence of the mind in disease. People of culture and education have been treated by these methods with satisfactory results, diseases of long standing have been ameliorated and even cured. The numerous cases of temporary arrest of disease, while not showing power to cure, yet exhibit a wonderful power of some sort.”

Remember Hamlet's warning that “there are more things in heaven and earth, Horatio, than are dreamt of in your philosophy.

Psychotherapy is useful in :-

1. Hysterical diathesis, a condition in which the emotions preponderate over the intellect and will.
2. Neuralgia.

Professor Dejerine treated hysteria and neurasthenia by isolation and psychotherapy. Drugs were but seldom employed; hypnotism was not used. The results attained were very striking. Paralysis, contractures, anorexias, nervous crisis, gastropathies, etc., many of them having

lasted for months or years, disappeared in a few days, weeks or months under the influence of this simple treatment. Among the hysterical, the paralysis, the contractures, etc. the anæsthesias and the pains are amenable. Among the neurasthenics, psychic treatment aids enormously in combating the sensation of fatigue, the circulatory disturbances, the insomnias, the digestive troubles, the sexual weakness, and the abnormal mental states.

3. Disease of the joints.

4. Organic disease of the heart.

5. Nervous diarrhœa.

Dr. Dubois remarks :—

"Your diarrhœa, only lasts so long because you are always thinking of your intestines. Will you please try to forget it. These patients when kept in bed, and on a preparatory milk treatment, stand overfeeding very well."

Psychic therapy is applicable to psychoneurosis and other nervous diseases to which flesh is heir. Ever since medicine existed patients and physicians have been able to prove it. The physician, must inculcate in the patient's head the idea that he will get well.

The writer remarks :—

"Mind, in my dictionary the word *nervous* is always coupled with the word curable; these two adjectives go together." Competition develops commercialism and tends to make the physician forget his humanitarian calling.

N. B.—The reader may find informations in two valuable books :—"The Force of Mind," by Schofield, and "The Psychic Treatment of Nervous Disorders," by Dubois.

THERAPEUTIC SUGGESTION.

Therapeutic Suggestion, or the management of all diseases heretofore treated by all mental or mind-cure methods, is reduced to a positive science and the results are marvelous.

By suggestion in the treatment of disease we mean the presentation of thoughts to the mind of the patient in a manner and under conditions that will result in the functional and organic changes necessary to restore conditions of health.

That Christian Science, Mental Science, Magnetic Healing, Metaphysical Healing, and other mind or mental cure methods have relieved hundreds of people nobody can deny, and we should give them credit for all they have done and for what they are still doing; and we want it well understood that we do not antagonize them, for they are good so far as they go, and serve many people perfectly. But Therapeutic Suggestion not only takes their place, but it is always in advance of all of them; it not only takes in the healing elements of all magnetic and mental methods of cure, but it simplifies them, and shows that they are all under the operation of one universal, positive law.

Suggestion cures people; it is not confined to the treatment of diseases alone, but that it reaches far beyond the domain of the ordinary practice of medicine with drugs.

Mind Power, Will Power.

“It is the mind that makes the body rich”—*Shakespeare*.

Pope has said that “the proper study of mankind is man.” It is certain that the highest and most important study of man is *mind*.

Taking it for granted that the mind controls the body, we now undertake to explain to the reader *how* the mind, through the power of suggestion, controls the functions of the body and cures disease and corrects habits.

Hudson's Hypothesis :—

Man is really possessed of two minds, instead of one, as is generally believed and taught. One we call the "objective mind," WAKING CONSCIENCE, *conscience*, and the other the "subjective mind," SLEEPING CONSCIENCE, *sub-conscience*.

The **objective mind** is the mind which results from organization, and it may be regarded as the function of the brain. It is the mind with which we do business; the mind that operates through the five physical senses. It comes, develops with, and finally dies with the physical body. It controls all voluntary motion.

The **subjective mind** is a distinct entity. It is a stratum of consciousness beneath the normal consciousness which is capable of independent action and which has powers distinctly its own. Information can reach the mind independent of the objective senses, a fact not irrelevant to psychology. It occupies the whole human body, and, when not opposed in any way, it has absolute control over all the functions, conditions and sensations of the body; it is constantly amenable to control by suggestion; it is incapable of inductive reasoning; it has absolute control of the functions of the body; it is an inner and secondary self, which one may instruct by suggestions from the objective mind. The law of telepathy, is one of the powers of the subjective mind. One of the characteristics of the subjective mind is self-preservation;

it is always a ready receiver and transmitter as well ; it has a memory distinctly its own ;

V. B.---The transmission of information by the objective mind to its subjective mind is what we call auto-suggestion. The subjective mind has one means, independent of the objective senses, of both receiving and sending information.

Nutrition, waste, all secretions and excretions, the action of the heart in the circulation of the blood, the lungs in respiration or breathing, and all cell life, cell changes and development, are positively under the complete control of the subjective mind. This subjective mind can see without the use of physical eyes. It perceives by intuition. It has the power to communicate with others without the aid of ordinary physical means. It can read the thoughts of others. It receives intelligence and transmits it to people at a distance. Distance offers no resistance against the successful missions of the subjective mind. Its memory is perfect. It never forgets anything. It never sleeps. It is capable of sustaining an existence independent of the body. It never dies. *It is the living soul.*

The passions and appetites are creatures of the subconscious mind. The most scientific and effective cure for an abnormal passion or appetite is that method which reaches and works upon the subjective mind. Below the plane of consciousness there is a sort of mechanical operation which grinds out ideas that are then handed up to the conscious mind. Dr. Carpenter *Mental Physiology* Page 517 terms it "unconscious cerebration."

Miss Cobbe has admirably described :—

"It is an everyday occurrence to most of us to forget

a particular word, or a line of poetry, and to remember it some hours later, when we have ceased consciously to seek for it. We try, perhaps anxiously, at first to recover it, well aware that it lies somewhere hidden in our memory, but unable to seize it. As the saying is, we "ransack our brains for it," but failing to find it, we at last turn our attention to other matters. By-and-by, when, so far as consciousness goes, our whole minds are absorbed in a different topic, we exclaim, "Eureka! the word or verse is so-and-so." So familiar is this phenomenon that we are accustomed in similar straits to say, "Never mind: I shall think of the missing word by-and-by when I am attending to something else;" and we deliberately turn away, not intending finally to abandon the pursuit, but precisely as if we were possessed of an obedient secretary or librarian whom we could order to hunt up a missing document, or turn out a word in a dictionary, while we amuse ourselves with something else. The more this common phenomenon is studied, the more the observer of his own mental processes will be obliged to concede that, so far as his own conscious self is concerned, the research is made absolutely *without him*. He has neither pain, nor pleasure, nor sense of labor in the task, any more than if it were performed by somebody else; and his conscious self is all the time suffering, enjoying, or laboring on totally different grounds." (*Macmillan's Magazine*, November 1870, page 25.

Now, in proper, healthy or normal conditions of life, the objective mind and the subjective mind act in perfect harmony with each other. When this is the case healthy and happy conditions always prevail. But, unfortunately per-

haps, these two minds are not always permitted to act in perfect harmony with each other; this brings mental disturbances, excites physical wrongs, functional and organic diseases.

Happily, by a knowledge of and a strict obedience to the laws of life, the objective and subjective minds can be kept in harmony with each other; and when they get out of harmony, disease and pain result, but they can be brought into harmony again and perfect conditions of health restored, all by *suggestion*.

The subjective mind is constantly amenable to the power of suggestion by the objective mind, either that of the individual himself (auto-suggestion) or that of another. Therefore, notwithstanding the subjective mind has, when not opposed in any way, absolute control over all the functions and sensations of the body, and is entirely capable of preserving their harmonious and healthful manifestations, it is also true that improper suggestions from the objective mind of the person himself, or from some other person, may divert the action of the subjective mind, and sickness, and death may be the result. On the other hand, in cases of sickness, proper suggestions made to the subjective mind of a patient, by his own objective mind or by that of some other person, will as certainly result in healthful changes and complete relief from pain and disease.

Thus we see how physical changes may be wrought by mental influences; how pain may be relieved and disease controlled by proper suggestions. If the subjective mind has full control which is absolutely true, over all of our

bodily functions, and if we can reach the subjective mind by suggestion, which is also true, then all that is required in order to give relief and cure disease is for us to present suitable ideas to the minds of our patients—thoughts that will result in the relief and cure of disease and the correction of habits.

For example every body has experienced in some part of his life from pain. If we ponder over pain it increases where as if we divert our mind to some other thoughts the pangs of pain decrease or even disappear.

Again for example, if we have a patient whose left leg is suffering from paralysis of sensation, we direct particular attention to this left leg, and premise by saying something like this to the patient, after taking his left leg in ours: "This is your left leg. Natural sensation shall come back to this left leg like the right one. All feeling shall return to this left leg. Sensation is already coming back to this left leg. We keep on repeating these same words for several minutes. The patient hears what we say. These speeches are so many sensation memories that we are sending to the brain, and if we keep on sending them in this way every day, they will arouse new mental activities in that part of the brain presiding over the function of sensation in the patient's left leg; the cell elements in this part of the brain cortex undergo the changes required, it again properly functionates, and sensation returns to the patient's left leg.

Direct suggestion either automatic or induced fortifies "will power;" and if you once instill the thought in the mind "I shall and will be cured," you have won the race.

Seneca said: "It is a part of the cure to wish to be cured."

The fear of not being cured of the present disease, depresses us, drags us down, makes us sick, wears us out, literally *kills us*. On the other hand, a lively hope of cure revives us, invigorates us, enables us to master ourselves, prevents disease, and throws it off if it comes.

The subjective mind that is imbued with the idea that is has the power to maintain the bodily conditions in any environment is indeed a formidable power against disease. Disease germs entering such a system will find themselves attacked so vigorously as to find lodgement difficult.

"No man is free who is not master of himself."—(Claudian). Pythagoras truly said: "No man is free who cannot command himself."

We can make you understand this law of cure. It is this ignorance of the law of cure by suggestion that makes people sick and keeps them sick. A knowledge of the law changes your method of thought, and you begin to lead another and different life. The cure of diseases and the correction of habits by suggestion is an educational process. We earnestly engage to instruct our patients in this law of cure, and by appropriate suggestions we persuade people to leave off their old methods of thinking and place their minds upon conditions worthy of enjoyment. We change their habits of thought, and thus renew them in soul and body. In this way diseases are cured and habits corrected.

OLD AGE.

Senility is not a disease but a natural stage in the evolution of the living being. In order to have a clear view of the period of decrease it is necessary first of all to know what the period of increase is, or, in other words, we must first get a collective bird's-eye view of the individual's complete career. I propose to show that senility has its well-marked place in normal life. It is of great importance that this idea be always present in your minds so that as physicians you may not pass by this period of human life unnoticed, the period when the individual, though not sick, yet is growing old and needs your assistance to grow old normally and prevent his senilization to go on too rapidly or irregularly.

We know now that organized bodies are combinations of material atoms taken from their environment, to which they return. The first term of the proposition is birth and growth —*nascent et crescent*, as the ancients used to say; the last term is the growing old and death —*senescent et moriuntur*. You see clearly that senescence, growing old, has its place —and a grand place it is—in the phenomena of organic life; and according to our conception of the human being this phase ought not to be left in the unilluminated shadow.

In the first chapters of Dr. Letourneau's work, "Biology," you will find a cursory critique of the more authoritative definitions of life, all of which suffer from the defect of being too comprehensive enough.

Letourneau says rightly that it is of more value to clear the field of too many definitions and limit oneself to the principal facts of life that have been observed. He gives

the following definition of life: "Life is a continual simultaneously double movement of composition and decomposition carried on within the plasmatic substance or the anatomic elements which are functioning under the influence of this movement in conformance with their structure."

Dr. Boy-Teissier's Definition :—

"The living being is a temporary individualization of variable form: it is a sum of forces capable of assuring the permanence of the form (once assumed) and of calling forth the determination of similar other forms before it is itself disintegrated."

Matter, is known to us as to its essence, but since matter and force do not go one without the other, it would seem that the second term might represent an entity more real and less subject to controversy. In the definition you have the affirmation of the principal characteristics of a living being, to wit: individualization first of all, which means that this being finds in itself the power to assure its permanency, its proper, or immediate, personality; then it has its second, or mediate, personality by procreating a personality similar to itself; and, lastly, it terminates its cycle by restoring to the external medium the elements of its constitution which it has received from it. This last term, the disintegration, is death, and the time in which it is accomplished is "senescence," the period of growing old.

We are now prepared, in a measure, to put the question: Why does the living being die? How does it die?

This will, at the same time, be a study of senescence, of growing old. It is by these general ideas that we will be

guided in the study of senilization and of old age in the human being. You see that this excursion into the domain of biology will serve to set out for us the stakes which will guide us in our medical research work applied exclusively to the human being.

Cicero said: "If one would be old long let him be old betimes.

Youth is the period for expenditure, for progress, and for expansion. During its palmy days the energies are ebullient and demand opportunity. The vital resources throng to the outlets and burst through restraint. There is a Force, a power in youth that has not as yet marked out its limit.

The middle period comes. The force of the current is yet there, but it flows quietly, albeit the channel is deep."

If men were only as anxious to live well as they are to live long, they would perhaps more frequently attain their desire. There have been recently many apostles of longevity. Disraeli rightly said: "Man is not the creature of circumstances; circumstances are the creatures of man. We are free agents, and man is more powerful than matter."

Sir James Crichton-Browne thinks that in order to attain a century man must go back to the soil and live a more primeval life. Life to me is an incessant struggle, and as a mere existence it would not be worth having. Emerson said: "Life must be lived on a higher plane. We must go up to a higher platform, to which we are always invited to ascend, then the whole aspect of things changes."

Herbert Spencer says: "Perfect correspondence would be perfect life. Were there no changes in the environment, but such as the organism had adapted changes to meet, and were it never to fail in the efficiency with which it met them, there would be eternal existence and eternal knowledge." The chances of any of you attaining to this ideal state of existence in this sphere are very remote, and the writer cannot honestly say that such a consummation is either desirable or devoutly to be wished. Medical officers of health devote a great deal of attention to the environment, and to a certain extent are successful in the saving of inefficient lives, or those who are not capable of adapting themselves to the environment; but we, as medical practitioners, have got to go many steps further and improve the efficiency of that wonderfully adaptable organism, the human frame. In so doing we have to start from the earliest inception, from the fertilization of the ovum. "Man," says Emerson, "is physically, as well as metaphysically, a thing of shreds and patches, borrowed unequally from good and bad ancestors, and a misfit from the start." At present society is ruled by sentiment rather than reason, otherwise we should not allow such a disease as syphilis, which ruins the constitutions of myriads and their progeny, to run rampant throughout the land; their offsprings are as if handicapped in the race of life.

Prof. Sajous' Theory :—

"Old age, is a chronic disease due to degeneration of the glands yielding internal secretions, the thyroid, the sexual, and the adrenal glands in particular, but including also the liver and the kidneys; this pathologic condition being

characterized by the abundant growth of connective tissue, diminution of the oxidation processes, and a concomitant condition of autointoxication."

Lorand, in his wonderful book *Old Age Deferred* has described old age as "a chronic disease due to degeneration of the glands." Prof. Metchnikoff mentions the large intestine as the seat of old age. This is true in so far as the large intestine affects the glandular system, which is the discharging end of Nature's Sewer System. As designed by nature fluids are conveyed through the glandular system to the large intestine. As designed by many individuals through habitual and gross neglect, the method is reversed and the fluids are conveyed through the large intestine to the glandular system. This method is unnatural, poisonous, and disease-producing because fluids absorbed from a sewer system will produce sewer results.

By maintaining a clean glandular system and a few additional glasses of water daily, "chronic disease due to degeneration of the glands" will be prevented. This means a clear skin, good health, a feeling of well being, and old age deferred.

The Liver of the Aged.

After the age of forty as a general rule it is said that the mass of the liver diminishes, while, in old age there is usually senile atrophy of that organ. In the fetus the liver is comparatively a much larger organ. Senile atrophy of the liver and general senility seem to advance together. As the liver is the organ so entirely essential for fat or oil assimilation from the intestine, and for the aid of fat growth in the

body from other foods, thus supplying the essence of materials for oxidation or combustion, it is true, that the want of these very materials by the body is the condition which brings about senility.

Senility is characterized first by lessened carbon or fat excretion from the lungs. This takes place as a rule at about the age of forty in men and after the menopause in women. Thereafter the carbon excretion from the lungs gradually diminishes with advancing age. This goes to show that the body does not assimilate or make fats as well as in youth—the spring of life. With age advancing we find a shrinking of fat from all tissues and as the fat shrinks away, the skin, bones, muscles, circulatory organs and finally the brain, yield to lack of fat and hardening. Purulent cholecystitis, cholangitis, and gall stones are usually diseases of mature age.

View's regarding old age :—

Prof: Osler (*Aiquanimitas 2nd edition 1906. Page 399*) remarks.—“Man's active life ought to terminate at 60, that he should then either cease work or be put into a lethal chamber.”

Happy and contented old age :—

“My soul I know not how, refusing to be kept down, ever fixed its eyes upon future ages, as though from a conviction that it would begin to live only when it had left the body”—*Cicero on old age ; golden treasury edition.*

Soured milk and old age :—

Professor M. Metchnikoff of the Institute Pasteur, the most eminent biologist of the day in his book entitled, “The Prolongation of Life,” has advanced the theory that old

age and sclerosis of the tissues are largely due to the absorption of toxins generated by certain microbes in the alimentary tract which are injurious to health and long life, and advocates the use of soured milk as a means of gradually replacing the putrefactive bacteria of the large intestine with the lactic acid bacilli, or in other words to introduce non-pathogenic lactic acid bacilli into the system to wage war on these injurious denizens of the intestine.

Can we avoid growing old?

Old age, Prof : M. Metchnikoff affirms, is a malady which is perfectly accessible to certain treatment and in a hundred years people will treat it and cure it just as they now treat and cure bronchitis and diphtheria.

Why do we get old? asks M. Metchnikoff. Because the cells of our tissues are crushed by the ever-increasing amount of disorganizing elements. Just as the white corpuscles in the blood, on condition that they are present in sufficient numbers and in good form, are "microphage," devour the bacteria and protect the organism from their attacks, so the special elements of our tissues are "macrophage" and devour the nervous cardiac, hepatic and kidney cells.

M. Metchnikoff, after having created the "microphagocytose," that most ingenious explanation of disease in which the white corpuscle acts as the policeman in our organism, which goes to meet our enemy, the microbe, combat it and conquers it, or itself succumbs to its attacks, has now created the "macrophagocytose," the name which may be taken to signify old age. They would consist essentially in reinforcing the defensive elements and in weakening the aggressive tendency of the "macrophage."

According to M. Metchnikoff, the defensive elements in their normal condition secrete a non-diffusible protective substance, which puts a check, as far as they are concerned, on the voracity of the "macrophages." This protective secretion is diminished or abolished by various causes, and principally by the poisons from the bacteria of the great intestine and which are reabsorbed. As these bacteria develop for preference in alkaline centres, the acidulating microbes, such as the lactic bacillus, are deadly to them. It seems that we ought to find in this simple observation the real cause of the longevity of certain peoples, especially the Bulgarian mountaineers.

We eat too much meat: that is a fact. All men of science have observed that people remarkable for longevity eat in a fashion different from ours. Their food is made up of vegetables, fruit and milk, in a word, matter which constitutes a refreshing *regime* and which diminishes as much as possible the intestinal flora.

Therefore, in order to avoid dyspepsia, appendicitis and all maladies of auto-intoxication of the intestine and live to a green old age, we must diminish, not by the use of drugs, but by an appropriate *regime*, the abnormal fermentation in the intestines, and defend ourselves against the enemy we carry in our body, which is the source of all our troubles.

Birds which have no great intestinal canal do not suffer from old age. They preserve up to the last their feathers, the suppleness of their bodies and the alertness of their movements; but how can we exterminate the maleficent army of microbes installed in the very centre of our organism?

For many years lactic fermentation has been recognized as a powerful destroyer of the microbe of putrefaction. The customs of primitive peoples are, on this point, more scientific than our own. The Indian, the nomadic tribes in Algeria and the Black Sea, and the black races in South Africa never take raw milk. They only take milk after it has first been boiled and then curdled, that is to say, when it is in a state of fermentation.

In Bulgaria, in the districts where the inhabitants have a remarkable vitality and are exempt from disease, their only food is curdled milk,

The Prevention of Pre-senility or Premature old age.

Nature intended man to retain all his powers and faculties unimpaired to an advanced age; but the march of civilization has been so rapid, the body has been unable to adapt itself to the demands made upon it, and the spectacle of men prematurely old is a common one.

The gauge which most accurately marks this reduction of vital power is the status of the reproductive system. The wonderful stimulus, the energy and virility which the healthful activity of this function imparts to the entire organism is noted at puberty, and remains throughout life a true indicator of the general bodily condition of the individual.

1. Avoid purin bodies (meat etc.) from the list of diet. A healthy working youth can take them safely within the physiological bound.

The retension of the products of nitrogenous waste in the system, especially uric acid, is a factor in the produc-

tion of high arterial tension, arterio-sclerosis, and other signs of premature decay.

2. Green vegetables and fruits keep the muscular coat of lower bowel in tone by the copious use of insoluble material, impart average force and endurance three times greater than that of the average meat-eaters, keep the blood alkaline and therefore an ideal diet for the prevention of premature old age and the aged.

Fruit Diet.

Fruit is, par excellence, the best of all food cleansers; it is the only food which entirely satisfies our sense of taste; it is the only food that appeals to our instinctive senses, whether of sight, taste, smell, or touch; it is the only food that needs no preparation; it is the only food which awakens our aesthetic emotion, for we can find joy in its creation and reverence in its consumption; and it is a food of such marvellous purity that were it alone eaten age could neither wither us nor disease blast us. We reject it—for one reason, because science, forsooth, asserts it to be deficient in protein; hence the *rationale* of using fruits as side dishes of our principal meal.

In what way does fruit act? The mechanism is rather complex. In the first place, the fruits, although acid, render the blood alkaline, and their use constitutes an alkaline treatment. This paradoxical action arises from the fact that the tartrates, citrates, and malates of potassium, to which the fruit owes its acidity, are decomposed in the organism and transformed into alkaline carbonate of potash. In what does the alkaline cure by fruits differ from that by carbonate of soda or mineral water?

First because the mechanism of the alkalization is not the same. Bicarbonate of soda, when ingested, provokes an abundant secretion of hydrochloric acid in the stomach. This acid comes from the decomposition of chloride of sodium in the blood, and it is by the extraction of this acid that the blood is rendered alkaline. In the case of fruits, the salts penetrate into the blood, are consumed, and transformed into carbonate of potash.

Secondly, the alkaline metal in mineral water is sodium in the fruit potassium ; as this latter fixes itself particularly on the cells of the organism and the former in the humours, it may be supposed that fruit renders alkaline the cells and mineral water the interstitial liquids.

The alkaline action of fruit is more energetic than commonly believed. Dr. Linossier calculates that a pound of strawberries equals one drachm of bicarbonate of soda, a pound of grapes, half a drachm, and the same amount of lemons, 50 grains.

Fruit is further diuretic probably by its sugar and salts of potash ; it acts also as a laxative.

In fruit juices we have an ideal laxative as well as an ideal antiscorbutic. Malnourished infants suffering from various disorders are brought back to health with the aid of these juices and a proper modification of milk. In infants suffering or convalescing from bronchopneumonia, lobar pneumonia and other diseases, fruit juices are well borne. They also favour digestive assimilation of foods, the diuretic action of the kidneys, and the cleansing of the enteric tract :—
Therapeutic Medicine.

The *grape cure*, for instance, is recommended in certain forms of dyspepsia, constipation, chronic diarrhœa, congestion of the liver, infectious icterus, abdominal plethora, gout, gravel, and certain diseases of the skin of arthritic origin.

The *strawberry cure* has been employed with benefit in gout and rheumatism.

Lemons also are useful in some forms of rheumatism; however, they are contra-indicated in dyspepsia with an excess of HCl on account of their acidity.

Apple contains a larger percentage of phosphorus than any other fruit or vegetable. This phosphorus is admirably adapted for renewing the essential nervous matter of the brain and spinal cord. Also, the acids of the apple are of signal use for people of sedentary habits, whose livers are sluggish in action, those acids serving to eliminate from the body noxious matters which, if retained, would make the brain heavy and dull, or bring about jaundice or skin eruptions and other troubles.

It is also the fact that such fresh fruits as the apple, pear and the plum, when taken ripe, and without sugar, diminish acidity in the stomach rather than provoke it. Their vegetable salts and juices are converted into alkaline carbonates, which tend to counteract acidity.

A good, ripe, raw apple is one of the easiest of vegetable substances for the stomach to deal with, the whole process of its digestion being completed in eighty-five minutes. *The Dietetic and Hygienic Gazette.*

The general composition of fresh fruit is as follows:—

Water, 85 to 90 per cent.

Proteids, 5 per cent.

Fat, 0.5 per cent.

Carbohydrate, $5\frac{1}{2}$ to $10\frac{1}{2}$ per cent.

Cellulose, $2\frac{1}{2}$ per cent.

Mineral matters, 0.5 per cent.

Of the proteid 80 per cent. is absorbed; of the fats 90 per cent., and of the carbohydrates, 95 per cent.

Following out the classification of Hall, we find

(1) Under the *acid* fruits, lemons, limes, grapes, oranges, and pineapples.

(2) Under *sweet* fruits figs, dates, prunes, and dried raisins.

(3) Under *bland* fruits, pears, blackberries, melons and bananas.

The acid fruits are valuable for their acids and organic salts, existing mainly in combination with alkalies, as the citrates, malates, or tartrates of potassium, sodium, magnesium and calcium.

When these fruit juices are taken into the digestive canal they are readily absorbed and carried with the absorbed food to the liver, where the acids and the acid elements of the organic salts are oxidized, releasing the potassium, the sodium, and the magnesium, etc.; which are changed to carbonates, thus increasing the alkalinity of the blood.

These alkalies are eliminated by the kidney, hence the diuretic action. The acid fruits are, of course, markedly

diuretic. Bland fruits are used more for their appetizing flavors.

Sweet fruits are the ripe fruits where in the ripening the cellulose and tannic acid of the unripe fruit are changed to sugar and fruit juices. The excess of acids in the unripe fruit leads to irritation of the stomach and intestines, causing colic and diarrhoea. If, however, the cellulose and the acids are in more moderate quantities, as in ripe fruit, a gentle stimulation on the intestinal wall is exerted.

An experiment :—

A lady doctor Mademoiselle. Toteyko, *measured force and endurance of vegetarians* and found out by quite exact experiments, that their average force and endurance were three times greater than that of the average meat-eater. This happened just before *Dr. Fisher of Yale University made similar experiments in America*. After having completed her study on forty vegetarians, she published the results, and in conclusion, she said that these *scientific experiments* proved so evidently the superiority of vegetarian diet that, to be logical, she could not do otherwise than become a vegetarian herself, which she did. For her investigations she has since received a prize from *the Academy of Medicine in France*, which is a great honour for the authoress, and an important fact for vegetarianism.—*The Vegetarian Messenger*, December 1909.

3. Milk and its derivative soured milk and white of egg are the staple food of the aged.

Hence the diet made up of (i) purin-free bodies (ii)

fruits (iii) and green vegetables are best for people advanced in years.

"Most people have no idea how little food the body needs, particularly in old age." (Weber)

4. Certain drugs *e.g.* formic acid and formates, iodides, arsenic and mag : sulph are recommended.

To combat with adynamic and senile weakness, the chemist of the day has invented a medicine called formic acid the active principle of ant.

Formic acid in the shape of formates is used

- (i) to increase the muscular power,
- (ii) to render micturition in old age more easy,
- (iii) to have a tonic action both on unstriated and striated muscular fibres,

Iodide prevents arterio-sclerosis, arsenic sharpens appetite, while mag. sulph lowers blood pressure by opening the bowel.

Remember the motto :- -

"A man is old not by age but by pulse."

5. Bath.

(a) External.

(b) Internal.

(a) The physiological action and therapeutic use of water which we use for washing our body is known to all.

(b) Internal bath.

The practice of sipping a glass of warm water early in the morning on an empty stomach serves the purpose of flushing out the upper part of the alimentary tract, while

systematic use of using enema clears up the lower part of the intestine, a fact long known to the Hindus : The "Jogi" develops the power of sucking in water through the pumping action of the sphincter of rectum and letting it off at will ; by this the ascetic washes out the pipes of his body.

Colon flushing.

Arthur F. Hertz of Guy's Hospital in his work on "*Constipation*" on page 1. Says "recent observations have shown that fluids introduced through the rectum reach the cæcum without difficulty." Also on page 8, he writes : "By means of the X-ray I have observed a pint of a bismuth emulsion, introduced by rectum at a constant pressure of three feet of water, reach the cæcum and render the whole colon visible."

Thus the writer does not see the necessity of passing colon-tube for colon flushing, though recommended by Dr. Etter in *The Medical Summary* May 1910.

This simple remedy should be largely used in cases of auto-intoxications, (*intestinal*,—manifested by the presence of indican in the urine,—as well as *constitutional*, —indicated by such conditions as acetone, urea, uræmia, cholemia, acidosis).

The Anatomy of Colon:—

The muscular coat of the intestines is composed of circular and longitudinal fibres. In the large intestine, the longitudinal fibres are proportionately longer and better developed than in the small intestine. Their greater length permits the formation of sacculi (little bulgings) which become the seat of faecal and mucous accumulations holding in solution or suspension large quantities of toxins, ptomaines,

leucomaines and bacteria, a fact often unnoticed or inadequately recognised by the physician. It is, undoubtedly, a fact that the loculi of the colon contain small faecal and other poisonous accumulations of various kinds for periods extending over weeks, months, or even years. Their presence produces symptoms varying from a little catarrhal irritation up to the most diverse, and in some instance serious, obscure and reflex disturbances. Even when only the loculi are quite filled up, the main channel of the colon is unreduced in diameter. No mechanical difficulties, therefore, arise for a long time and the condition goes unrecognised. Occasionally a loculus becomes greatly dilated and filled up with faeces &c.,--reaching even the size of a fetal head, and being sometimes mistaken for an ovarian tumor or a malignant growth of some abdominal organ. The writer has noticed several cases of this sort in his practice. The most common part of the colon to become affected is the sigmoid flexure and the caecum.

The Physiology of colon.

The colon is a large musculo-membranous tube five feet in length. It may be appropriately compared to the main sewer of this human temple into which pass all the waste refuse and foul materials which are of no further use and must be got rid of as soon as possible. The neglect or failure for any reason to properly and regularly empty this great human sewer constitutes the disease called constipation. It is a curse of civilization. Seven tenths of the colon of the human family in civilized life are constipated.

Two main functions of colon are :--

1. It is the organ of absorption.

2. It is the seat of putrefaction.

Procedure.

Lie on the right side with the right arm under the body. Put the right thigh and leg straight out and the left thigh being at the right angles with the body and supported on a pillow, the left leg being flexed on the thigh. This position will allow a very easy access of 2 pints of luke warm pure water.

After the right amount has been introduced, lie as quietly as possible, for a few minutes. Then gently knead and rub the abdomen. Then roll from side to side a few number of times.

Old age and how to attain it.

Dr. Lorand (*le Mois Medical*). advocates the following twelve golden maxims and the writer adds two from experience. The "Fourteen Commandments" for the preservation of youth, and the attainment of a Green Old Age are thus summarised.

1. Live as much as possible in fresh and healthy air, especially in the sunshine, provided it is not too hot.

2. Eat meat but once a day and moderately or better avoid it during summer. Let the diet be composed principally of milk, eggs, cereals, green legumes, butter, cheese and fruit.

3. Take care of the skin, and each day take one bath.

4. Go every day to the closet. Cleanse the bowel once a week by the aid of a saline purgative and douche.

5. Dress in porous clothing, especially of wool; wear shirts with loose collars, and low shoes. Select, in summer,

a hat and clothing of white or yellow color, in winter preferring darker tints.

6. Go to bed early and rise in good time.

7. Sleep with the window open, in a bedchamber dark and quiet. Do not sleep less than six and a half hours or more than seven and a half ; eight and a half being the limit for a woman.

8. Rest perfectly once a week, passing the period from Saturday to Monday in the country or in the mountains if possible.

9. Avoid moral shocks, cares and excitements of the spirit.

10. Be moderate in sexual indulgence, but do not suppress this instinct entirely.

11. Avoid localities badly ventilated or overheated.

12. Use alcohol, coffee, tea and tobacco very moderately. It is better to avoid them.

13. Practice walking exercise :—

The continuance of active habits prolongs longevity and certainly prolongs the happy and useful period of one's life.

14. There should be period of starvation especially during new and full moon.

How to live long.

In his book, "*The Philosophy of a Long Life*," M. Jean Finot says : "It is suggestion ill-employed which undoubtedly shortens it. Arrived at a certain age, we drug ourselves with the idea of the approaching end. We lose faith in our powers, and they abandon us. Under the pretext of the

weight of age upon our shoulders, we take on sedentary habits. We cease to busy ourselves with our occupations. Little by little our blood, vitiated by idleness, together with our ill-renewed tissues, opens the door to all kinds of diseases. Premature old age attacks us, and we succumb sooner than we need in consequence of a harmful auto-suggestion instead of dying by it. Let us have ever before our eyes the numerous examples of robust and healthy old age. We must store up in our brains healthy, serene and comfortable suggestions."

END.

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